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AUTHOR	Gentile, Nancy O.; And Others
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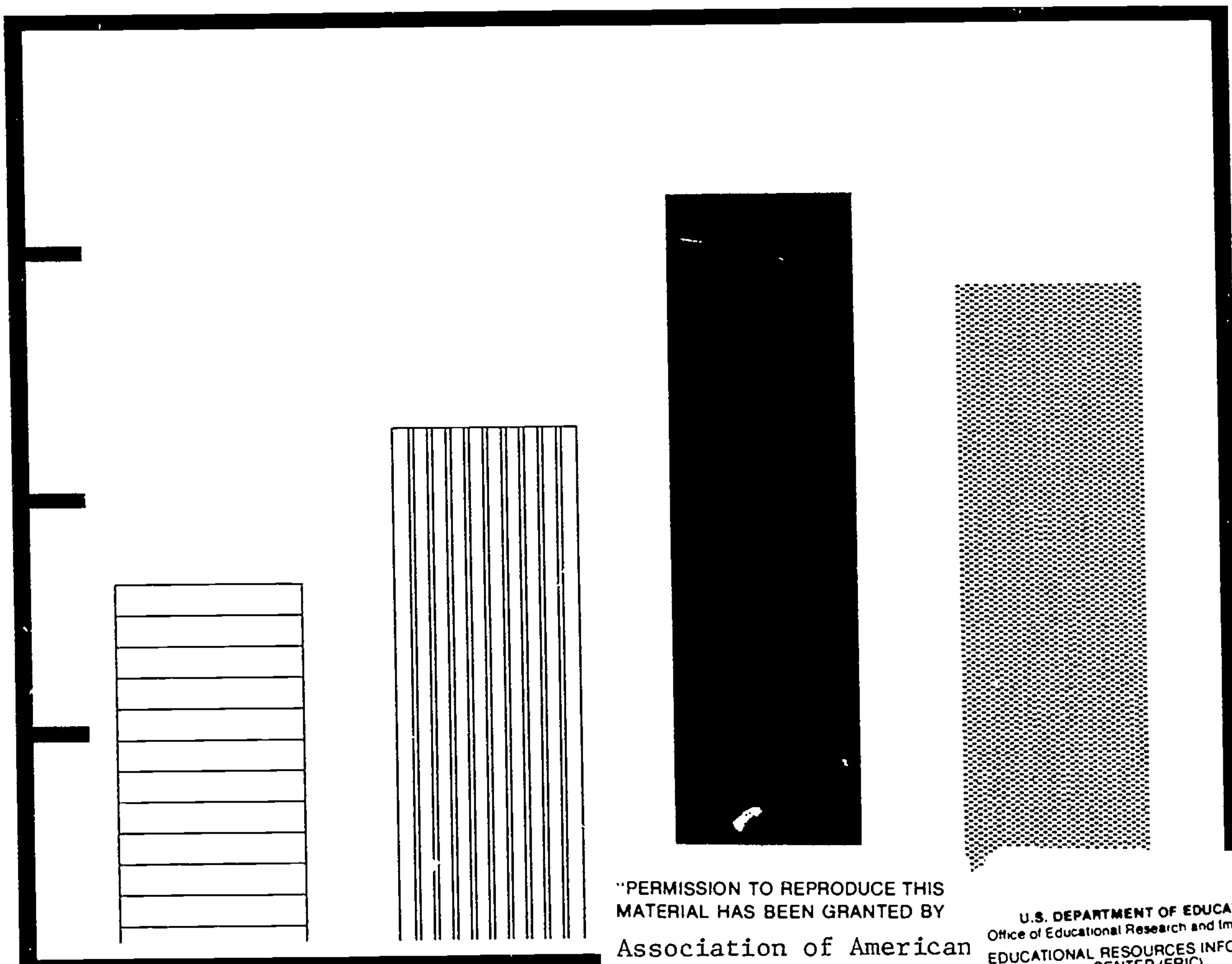
ABSTRACT

As the second phase of a larger investigation, this study sought detailed information about the post-doctoral research training experiences of the faculty in departments of internal medicine and about the relationships between their research training experience and subsequent research activity. A six-page survey form was sent to 7,947 full-time faculty members in departments of medicine of whom 79 percent responded. The survey contained questions on location of training and funding, structure of the training program, elements of the training program, impact of the training experience, and recommendations for change. Results indicated that the main characteristics typical of active researchers' training backgrounds are funding by the National Institutes of Health, training duration of at least 1 year, and a large share of training time spent in the laboratory. It was also found that among those who had received peer-reviewed research grants, there was an inverse relationship between duration of training and the length of time from completion of training to the award of the first grant. Appendixes contain the survey instrument, supplementary data, assessment of response bias, comparison of clinical faculty to those without clinical rank designation, NIH clinical research center usage, and additional data comparisons. Contains 14 references. (JB)

POST-DOCTORAL RESEARCH TRAINING OF FULL-TIME FACULTY IN DEPARTMENTS OF MEDICINE



Association of Professors of Medicine
655 Fifteenth Street, N.W., #425
Washington, D.C. 20005

Association of American Medical Colleges
One Dupont Circle, N.W.
Washington, D.C. 20036

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Nancy O. Gentile
Gerald S. Levey, M.D.
Paul Jolly, Ph.D.
Thomas H. Dial, Ph.D.

Association of Professors of Medicine
655 Fifteenth Street, N.W., #425
Washington, D.C. 20005

Association of American Medical Colleges
One Dupont Circle, N.W.
Washington, D.C. 20036

The authors wish to acknowledge the significant contributions made to this report by the members of the APM Manpower Task Force:

Francois M. Abboud, M.D.

John A. Balint, M.D.

Graham H. Jeffries, M.D.

James P. Nolan, M.D.

George A. Porter, M.D.

Jay H. Stein, M.D.

Robert C. Talley, M.D.

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LIST OF TABLES AND FIGURES

I. INTRODUCTION

The lack of data about medical faculty involvement in research has led to conjecture about current and future research manpower needs. In response to this circumstance, the Task Force on Manpower Needs was established in 1974 by the Association of Professors of Medicine (APM). Its purpose was to establish national policy on the training of general internists and subspecialists.

The Task Force has undertaken several studies of manpower needs in order to obtain sound information on which to base its policy statements. The Study of the Current Status of Research Activity for full-time faculty in departments of internal medicine was developed as part of the overall plan of the Task Force. This study, conducted in cooperation with the Association of American Medical Colleges (AAMC), began in 1983. At that time the internal medicine faculty at 119 of the 123 U.S. medical schools that had departments of medicine were surveyed. Findings of that survey (now referred to as Wave I of the project) have been published in the Annals of Internal Medicine.[1] One product of that research effort was a criterion for defining which faculty are active researchers, based on the percentage of time spent in research, laboratory space, funding, and publications. (A detailed description of this criterion and a discussion of its implications for the study of research training are included in Section VI.)

The Wave I survey, conducted during the 1983-84 academic year, collected detailed information about current faculty research activity but insufficient information about their prior research training. The APM and the AAMC therefore conducted a follow-up survey (Wave II) devoted exclusively to research training. The Wave II survey was conducted during the 1985-86 academic year. It was supported by a grant from the Richard King Mellon

Foundation for data collection, and the data analyses were supported in part by a contract from the National Institutes of Health (NIH). The results of that survey are reported here. The report describes the characteristics of research training and, in the final section, the relationship between research training and current research activities.

II. BACKGROUND AND STATEMENT OF THE PROBLEM

Before World War II, medical research was largely confined to relatively few schools, mostly private, which had funds for this purpose at their disposal.[2] Total national expenditures for medical research in 1940 were $45,000,000; the federal contribution to this effort was $3,000,000.[3] Funding from federal sources increased substantially following World War II, and by 1946 administration of these funds came under the authority of the National Institutes of Health (NIH). By 1952, national expenditures for medical research were $173,000,000, and the federal government was responsible for 42 percent of this amount, or $73,000,000. Universities and medical schools received $36,000,000 from this source, an additional $3,000,000 came from industry, and $15,000,000 was received from philanthropic sources.[4] As research in medicine was expanded through increased funding, many physician faculty members began to devote significant effort to research in addition to teaching and patient care. These "triple-threat" physicians became the academic ideal, and the salaries generated from research grants provided impetus for expansion of full-time faculty in all departments, including departments of medicine.

By the 1970s, the preponderance of research-based faculty appeared to lessen as a greater proportion of schools concentrated their efforts on clinical and teaching activities. Between the end of World War II and 1975 the number of accredited medical schools had grown from 77 to 113, a number of which relied on existing community hospitals and local physicians as faculty. These community-based schools emphasized the training of primary care physicians and were not heavily involved in biomedical research. Even at the larger and more established schools, increased patient care responsibilities fostered the development of two types of faculty members: one predominantly involved in clinical practice and teaching, and the other predominantly involved in research and teaching.[5]

Prior to this study, data on the research training and activities of medical faculty were limited. One source of data is the biographic and appointment information of full-time faculty maintained in the AAMC's Faculty Roster. The Faculty Roster is a computer database system containing demographic, current appointment, employment history, and academic qualifications of full-time U.S. medical school faculty. Faculty Roster data are derived from forms filled out and sent to the AAMC by full-time faculty members upon initial appointment. These records are updated and the new data forwarded to the AAMC as promotions, terminations and other pertinent changes occur.

Data reported in 1979 from the Roster indicated that 62 percent of all MD faculty, 86 percent of all MD-PhD faculty, and 89 percent of all PhD faculty devoted ten percent or more of their effort to research.[6] The information in the Roster is sometimes provided directly by the faculty member, but is often reported by the office of the medical school dean. The data about areas of responsibility provide a broad overview of the diversity of responsibilities of faculty with no gradation between ten percent effort and 50 percent effort for any specified activity. It therefore does not adequately address the extent or significance of faculty involvement in research.

The literature of the past several years has described an apparent decline in the proportion of physicians who are research investigators, but the current status of research activity, the numbers of individuals involved, and the proportion of their effort devoted to investigative research has been unknown. The absence of a standard definition of "active researcher" in the medical school environment limits analysis as well.

James Wyngaarden, in an address to the Association of American Physicians in 1979, called attention to the decline in interest in research participation, in research training, and in the ability to obtain NIH grants among MD faculty.[7] As medical school faculty constitute the major portion of NIH-supported physician investigators, there is concern that the decline in physician investigators will significantly affect the role of physicians as a leading force in health research.

In 1983 and again in 1985, the National Research Council's (NRC) Committee on the Study of National Needs for Biomedical and Behavioral Research Personnel recommended increases in the number of physicians receiving research training.[8,9] The findings of Sherman et al.[10], Thier et al.[11], Dibona[12], and Funkenstein[13] were cited in support of these recommendations.

In response to the need for data relevant to these issues the APM Task Force on Manpower Needs designed a two-phase study of the full-time faculty in departments of medicine. The first phase addressed the following questions:

(1) How does the percentage of effort spent in research by MDs compare with that of PhDs and those holding other degrees?

(2) How many of the faculty have external grant support and from what sources?

(3) How many faculty members have assigned laboratory space, what is the average amount of space, and is the amount of laboratory space correlated with other indicators of research effort?

(4) How many original articles are published by the faculty, and does the number correlate with percentage of effort spent in research?

(5) Do PhDs play a major role in departmental research activities?

(6) How much research training do the faculty members have?

The second phase of the study, which is the subject of this report, sought more detailed information about the post-doctoral research training experiences of the faculty in departments of internal medicine and about the relationships between the research training experience and subsequent research activity.

III. DATA COLLECTION METHODS

A. Definition of the Population

In order to completely and accurately identify the study population, the AAMC first prepared Faculty Roster forms for all known faculty members in departments of internal medicine, a total of 9,940 display forms. These were distributed to the schools. (An example of the display form can be found in Appendix A.)

The department chairmen were instructed to have each full-time faculty member who did not receive a display form complete a Faculty Roster questionnaire (form FR-1 in Appendix A). This procedure produced 2,174 additional forms for a total of 12,114.

The chairmen were also instructed to give the AAMC the names of any faculty members for whom display forms were received but who were no longer at their institutions. This resulted in a subtraction of 821 cases, bringing the total population estimate of full-time faculty in U.S. departments of medicine to 11,293. This was the population surveyed in Wave I.

The population surveyed in Wave II was the same as that in Wave I, with one critical difference: only the 7,947 individuals who responded to Wave I were sent the second questionnaire.

B. Instrument Development

The faculty research training questionnaire was jointly developed by the APM Task Force and the AAMC. The work sessions and pilot tests resulted in the production of a six-page survey form with questions on the following topics:

- Location of training and funding.
- Structure of the training program.
- Elements of the training program.
- Impact of training experience.
- Recommendations for change.

Demographic characteristics were provided by the Faculty Roster System.

The final version of the questionnaire appears in Appendix A together with a copy of the Wave I form.

C. Distribution and Collection of Survey Forms

The survey and Faculty Roster forms were sent to the department chairmen at 123 medical schools, who served as survey coordinators. Instructions were included. Each survey coordinator was asked to return the completed forms as quickly as possible to the AAMC. Updated information on faculty no longer at the institution was also requested.

The department chairmen were instructed to have each full-time faculty member who participated in Wave I complete a questionnaire. Two weeks after the deadline for returns, a telephone follow-up was made to schools with unreturned forms. When the acceptance of further responses was ended, a total of 5,604 responses had been received and 881 potential respondents had been determined no longer to be in the department to which their questionnaires had been sent. The overall response rate for the survey was 79.3 percent (5,604 of 7,066). Table 1 summarizes the survey responses. Individual school response rates may be found in Table B-1.

Table 1: APM/AAMC Research Activity and Training Surveys
Wave I/Wave II Rate of Response

	Wave I	Wave II
Number Sent	9940	7947
Number Added	2174	-
No Longer on Faculty	821	881
Population Estimate	11293	7066
Returned Complete	7947	5604
Rate of Response	70.4	79.3

D. Coding and Editing of Completed Survey Forms

Each response was coded and edited at AAMC offices in preparation for data processing. Staff members transcribed responses to meet coding specifications and edited those that appeared inconsistent. All coded responses were verified by a staff member other than the coder.

After the survey data had been keyed onto tape, they were merged with the Wave I records to generate a data file. This data file was used in all subsequent analysis.

E. Reliability and Validity of the Data

Without reliable and valid data, even the most sound and sophisticated analytical methods do not yield worthwhile findings. The main questions regarding the reliability and validity of the data used in this study are:

(1) How complete and accurate are the data in the Faculty Roster (the source of most of the background data used in the study)?

(2) How severe is nonresponse bias in the survey data likely to be, and in what ways might such bias influence the findings?

Findings relevant to the first of these questions were produced by a pilot study conducted before the Wave I survey. A report of these findings was submitted to NIH in February, 1986.[14]

The pilot test was conducted in 11 departments of medicine whose chairmen were members of the Task Force. These schools were selected in the hope that the highest possible response rate would result. The strategy worked well; the overall response rate was 90.5 percent.

Faculty in the participating departments were asked to update their Faculty Roster records. Analysis of the changes made by these updates found that the Faculty Roster had contained records on 85.5 percent of the faculty in participating departments at the time, and that the aggregate accuracy of selected critical appointment information and demographic items ranged from 88.0 percent to 99.9 percent. The completeness and accuracy of the Roster were of course improved by the updates generated by the pilot test itself and the subsequent surveys. The figures presented here may thus be viewed as lower-bound estimates for the accuracy of the Faculty Roster data used in subsequent sections of this report.

The investigation of response bias found that both Wave I respondents and Wave II respondents were virtually identical to the whole population of internal medicine faculty with regard to distributions of sex, age, ethnic self-description, type of school (public or private), and degree. The single relevant variable on which there appears to have been non-negligible response bias is level of involvement in research. Faculty who reported to the Roster that research was their primary responsibility made up 13.7 percent of the study population but 16.1 percent of the Wave II respondent pool. Faculty who reported no research responsibility made up 31.4 percent of the population but only 22.6 percent of the Wave II respondents. In view of these findings, it is probably safe to assume that the proportion of faculty designated active researchers and, by inference, the proportion who had post-doctoral research training, are overestimated in the findings that follow. A detailed description of the response bias analysis is provided in Appendix B.

IV. METHODOLOGICAL ISSUES

A. Issues Regarding the Study Design

This study, as stated elsewhere, was conceived and carried out with two main goals in mind: (1) to describe the post-doctoral research training of current faculty members in academic departments of medicine, and (2) to identify the training characteristics most closely associated with success as a researcher in this population. With regard to the first goal, there are no major methodological problems. With regard to the second, it is necessary to deal with aspects of the research design that severely limit the kinds of conclusions that can be reached unless certain simplifying assumptions are made.

Under a strict interpretation of the rules, the establishment of correlations between training characteristics and subsequent success as a researcher would require a survey of a cohort made up partly of individuals in training and partly of their peers who were not in training. It would then be necessary to survey the same cohort at some later time to determine whether or not they were engaged in research and, if so, how successful they were. A crucial part of any such study would be the comparison of research "survivors" to "nonsurvivors." If the definition of success were further restricted to include only success as a researcher on a medical school faculty, a comparison of faculty "survivors" and "nonsurvivors" would be necessary.

The study reported here was not such a cohort study. It was instead a cross-sectional survey of faculty in which participants were asked to retrospectively report the characteristics of the training programs (if any) they had undergone. Nobody in the study population can be identified as a "nonsurvivor;" therefore no data could be collected with which to demonstrate a correlation between "survival" and any other variable. Unless it is possible to present evidence from another source about such correlations, or at least make some plausible assumptions about them, conclusions about the correlations between training characteristics and research success can only be made conditionally, i.e., a training characteristic can only be said to correlate with research success on the condition that the trainee joins a medical school faculty and remains on the faculty long enough for his/her success or lack thereof to be measured. Such conditional statements have value in their own right, but it is desirable to be able to draw less restricted conclusions about the relationships between training and research success.

Plausible assumptions can indeed be made about the correlations between training characteristics and "survival" as a faculty member. Whether or not these assumptions are accepted is a matter of judgment, but if they are accepted the kinds of conclusions that can be drawn from this study are expanded.

We assume that any training characteristic positively correlated with the research success of medical school faculty members is very likely to be positively correlated as well with the likelihood that trainees will join medical school faculties and "survive" as faculty members. Certainly it seems implausible that a characteristic positively correlated with the one should be negatively correlated with the other two. This assumption would be false if those best trained to do medical research tended to go somewhere other than to medical school faculties (for example, to corporate research laboratories) on completion of their training, or if the best researchers on medical school faculties tended to be lured away into nonacademic positions. Although unable to present data showing whether these conditions prevail, we seriously doubt that they do, and it is difficult to conceive of any other set of conditions that would falsify the assumption. We therefore contend that training characteristics found to be correlated with research success among this study's participants are very likely to be correlated in a similar way with "survival" and success as they would be measured in a cohort study.

Another set of issues involves the difficulty of inferring causation from correlation. We assume that training characteristics are likely to have effects on subsequent research success rather than merely being correlated with it. Again, we are unable to prove the assumption but contend that it has high plausibility.

B. Issues Regarding the Use of Tests of Statistical Significance

Tests of statistical significance are appropriate only when used with data from a random sample of the population to which one wishes to generalize one's findings. When applied to statistics from a survey of an entire population they are at best useless, and at worst misleading. This point can be illustrated mathematically by considering the finite population correction factor.

The commonly used tests of statistical significance assume that the sample is taken from a population of infinite size. Of course, this is never literally the case in survey research, but the error is negligible as long as the sample comprises only a small percentage (i.e., no more than about five percent) of the population. As the ratio of sample size to population size becomes greater, the standard error of each sample statistic must be multiplied by the finite population correction factor to obtain a corrected standard error. The formula for this factor is:

$$\sqrt{\frac{N - n}{N - 1}}$$

where N is the population size and n is the sample size.

As long as N is large (so that the difference between N and N - 1 is trivial), the approximate value of the factor for any given ratio of sample size to population size can be calculated easily. If the ratio is .2, the factor is approximately the square root of the quantity (1 - .2), or about .89. Thus the correction of a standard error will reduce its size by slightly more than one-tenth. When the ratio is .5, the factor is about .71. The factor becomes smaller as the sample size approaches that of the population until, at the point where the two numbers are equal, the factor's value goes to zero. In other words, the true standard error of a population statistic is zero. This is a mathematical way of saying that tests of significance do not apply to population statistics.

It could be argued that the respondents to this survey actually constitute a sample of about 5,600 from a population estimated to number more than 11,000. Putting aside the probable violation of the randomness assumption, we question the value of tests of statistical significance even under this definition of the situation. Given a sample of 5,604 from a population of 11,2?3, a difference of less than one percentage point between a pair of numbers would be statistically significant at the .05 level. Under these circumstances, tests of significance are a hindrance rather than a help in interpreting the data; therefore we have omitted them from this report.

V. METHODS OF ANALYSIS

As the APM Task Force and the AAMC project staff synthesized the available information from both surveys, it became evident that a few central themes needed to be addressed. These themes were developed into six research questions closely related but not identical to the questions posed at the project's outset. Each of the questions is discussed below.

(1) What criterion can be established for distinguishing researchers from non-researchers?

The ultimate goal of the Wave I analysis was to use the findings to build a composite measure for defining the term "active researcher." This standard was based on how the respondents were distributed across categories of effort, assigned laboratory space, funding, and publications, and on what constituted an acceptable level of achievement in each of these areas.

Level of effort, funding, assigned space, and publications were analyzed in combination to establish a criterion for the identification of active researchers. As a starting point for the development of this criterion, it was assumed that every active researcher should have authored at least one publication during the two years immediately preceding the survey and should report that some of his/her effort was being spent in research. In addition to these essentials, it was assumed that active researchers were very likely to have external funding and assigned laboratory space. The current NIH principal investigators (PIs) were used as a "gold standard" or reference point against which to test various possible composite standards.

(2) What are the characteristics of the typical research training experience?

Characterizing the research training experiences of internal medicine faculty, like characterizing research activities, involves a multifaceted review of a variety of the training programs' characteristics. This phase of the analysis reviewed all of the variables gleaned from the survey: the length of training, the training institution, source of support, time allocation to various activities during training, availability of resources to trainees, and whether trainees subsequently became PIs on peer-reviewed grants. Also included were respondents' retrospective evaluations of the specific features of their training programs.

(3) How do the characteristics of the research training experience relate to success as a researcher? Outcome measures included:

- whether the faculty member is or was a PI.
- the time lapse between training and the first peer-reviewed grant (as a principal investigator).
- whether the faculty member is currently an active researcher.

A major goal of the post-doctoral research training experience is to prepare the trainee for later scientific research. In the medical school community, biomedical research is an important aspect of the faculty appointment.

This phase of the analysis investigated the movement of the faculty member from training to the research community in terms of early and continuous funding as a principal investigator.

The criterion developed in Wave I to identify active researchers was crosstabulated with the data elements characterizing the training programs. The resulting analysis shows the strength of the relationship between training and research activity for internal medicine faculty.

(4) How does the research intensity of the current institution of employment relate to the research intensity of the training institution?

The obvious expectation is that highly research-oriented institutions employ individuals who have been trained in similar surroundings. Less numerous, but also worth examining, are the faculty who trained at high-intensity institutions who are currently employed at other institutions and, conversely, those who have moved from training experiences at institutions with less research orientation to the most involved research sites.

(5) What is the relationship between source of support for training and sources of support for (a) the first peer-reviewed grant (b) current research, and (c) the research done over a ten-year period?

The source of funding for training may have an effect on faculty research activities that continues after the training is completed. Whether or not individuals obtain early post-training funding support and maintain support through their faculty careers is one of the main indicators of research "success."

This phase of the analysis constructed a research grant history for each faculty member from the period immediately after training to the time of the survey. The analysis shows how these funding patterns relate to various training experiences and to the composite measure used to identify active researchers.

VI. FINDINGS

A. Demographic Characteristics of Respondents

Table 2 summarizes the distribution of Wave I respondents, Wave II respondents, and the survey population by sex. Males comprised 89.6 percent of those who responded to both surveys and females accounted for the remaining 10.3 percent.

As Table 3 shows, the median age of the respondents was 47.2 years; 40.8 percent of the respondents were between 40 and 49 years of age.

The ethnic characteristics of respondents are described in Table 4. Some 87.4 percent were white, 1.1 percent were black, and 7.7 percent were distributed among five other ethnic categories.

Table 5 shows the distribution of respondents and the population by type of institution: 51.0 percent were employed by public schools and 49.0 percent by private schools.

More than 84.9 percent of the respondents had MD degrees, 6.3 percent had MD-PhD degrees, 7.6 percent were PhDs, and the remaining 1.2 percent had other degrees (Table 6).

Table 2: Distribution of Respondents by Sex

Sex	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Male	9927	87.9	7010	88.2	5023	89.6
Female	1346	11.9	932	11.7	579	10.3
Missing	20	.2	5	.1	2	.1
Total	11293	100.0	7947	100.0	5604	100.0

Table 3: Distribution of Respondents by Age

Age Groups	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Under 30 years	4	.0	2	.0	1	.0
30-39 years	2961	26.2	2098	26.4	1371	24.5
40-49 years	4425	39.2	3162	39.8	2286	40.8
50-59 years	2469	21.9	1758	22.1	1309	23.4
60-69 years	1177	10.4	820	10.3	586	10.5
70 years & older	197	1.7	94	1.2	45	.8
Missing	60	.5	13	.2	6	.1
Total	11293	100.0	7947	100.0	5604	100.0

Table 4: Distribution of Respondents by Ethnic Self-Description

Ethnic Group	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
American Indian	6	.1	5	.1	4	.0
Asian	785	7.0	527	6.6	323	5.8
Black	162	1.4	114	1.4	61	1.1
Mexican American	19	.2	12	.2	8	.1
Puerto Rican	83	.7	53	.7	32	.6
Other Hispanic	154	1.4	101	1.3	68	1.2
White	9098	80.6	6784	85.4	4895	87.4
Missing	986	8.7	351	4.4	213	3.8
Total	11293	100.0	7947	100.0	5604	100.0

Table 5: Distribution of Respondents by Type of Institution

Type of Institution	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Public	5304	47.0	3992	50.2	2857	51.0
Private	5989	53.0	3955	49.8	2747	49.0
Total	11293	100.0	7947	100.0	5604	100.0

Table 6: Distribution of Respondents by Degree

Degree	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
MD Only	9367	82.9	6600	83.1	4755	84.9
MD-PhD	717	6.4	547	6.9	352	6.3
PhD Only	904	8.0	646	8.1	426	7.6
Other	244	2.2	118	1.5	65	1.2
Missing	61	.5	36	.5	6	.1
Total	11293	100.0	7947	100.0	5604	100.0

From an examination of Tables 6 through 9, the representativeness of the survey respondents seems apparent. Further discussion on the topic of representativeness is provided in Appendix B.

B. Type, Year, and Length of Appointment

As Table 7 shows, 32.6 percent of the respondents were full professors, 27.3 percent were associate professors, 35.0 percent were assistant professors, 4.4 percent were instructors, and the remaining 0.3 percent held other titles.

The year of first appointment for respondents ranged from 1924 to 1983. Dividing this period into ten-year segments, the period from 1970 to 1979 accounted for the largest percentage of first appointments. Total length of employment in all academic positions ranged from 1 to 50 years, with a median of 10.4 years.

Tables 8 and 9 show year of first appointment to any medical school faculty position and total length of employment at all schools, respectively.

Table 7: Distribution of Respondents by Rank

Rank	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Professor	3012	26.7	2351	29.6	1828	32.6
Associate Professor	2714	24.0	2064	26.0	1529	27.3
Assistant Professor	4231	37.5	3015	37.9	1961	35.0
Instructor	1105	9.8	412	5.2	248	4.4
Other	147	1.3	58	.7	17	.3
Missing	84	.7	47	.6	21	.4
Total	11293	100.0	7947	100.0	5604	100.0

Table 8: Distribution of Respondents by Year of First Faculty Appointment

Year of First Appointment	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Prior to 1950	191	1.7	118	1.5	7[illegible]	1.4
1950-1959	820	7.3	618	7.8	448	8.0
1960-1969	2022	17.9	1516	19.1	1134	16.6
1970-1979	5173	45.8	3835	48.3	2766	49.4
1980 and later	2381	21.1	1734	21.8	1102	19.7
Missing	706	6.3	126	1.6	75	1.3
Total	11293	100.0	7947	100.0	5604	100.0

Table 9: Distribution of Respondents by Length of Employment

Length of Employment	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
1 - 5 years	3721	32.9	2752	34.6	1791	32.0
6 - 10 years	2706	24.0	1984	25.0	1464	26.1
11 - 15 years	1705	15.1	1256	15.8	931	16.6
16 - 20 years	1010	8.9	755	9.5	562	10.0
21 - 25 years	662	5.9	516	6.5	386	6.9
26 - 30 years	425	3.8	311	3.9	225	4.0
Over 30 years	338	3.0	247	3.1	170	3.0
Missing	726	6.4	126	1.6	75	1.3
Total	11293	100.0	7947	100.0	5604	100.0

C. Defining the Active Researcher

The most direct measure of faculty involvement in research is the faculty member's report of the percentage of his or her effort devoted to that activity. A second measure of significant research activity is research funding. A third measure is the existence of assigned laboratory space or other research space excluding office space. Publication is a fourth measure. Although no effort was made to assess the quality of publications, this study examined the number of original research publications authored or co-authored by respondents during the two years immediately preceding the Wave I survey.

No single measure of significant research involvement is adequate by itself. In an attempt to more accurately identify the faculty engaged in meaningful research, the faculty were grouped according to various combinations of four characteristics:

(1) Whether or not they spent at least 20 percent of their time in research from 1982 through 1983.

(2) Whether or not they had external funding for research from 1982 through 1983.

(3) Whether or not they had assigned research space from 1982 through 1983.

(4) Whether or not they authored or co-authored at least one original article or other significant research publication from 1981 through 1983.

The results of this combined analysis are shown in Table 10. It is assumed that occasionally a researcher may be found without space or without external funding, but rarely without either and never without effort or without original publications. Therefore, only faculty members represented by the first three lines of the table are judged to be significantly involved in research. Further, Table 10 indicates that there is a very strong correspondence between being an NIH principal investigator and meeting the definition of active researcher. This criterion for identifying active researchers was used as an outcome measure in subsequent analyses of research training.*

Table 10
Distribution of MD and MD-PhD Faculty
by Research Involvement Indices

Indices of Research Involvement	Not NIH PI		NIH PI	
	N	%	N	%
Effort, Funds, Space, Pubs†	1249	23	1360	78
Effort, Funds, Pubs (No Space)†	475	9	104	6
Effort, Space, Pubs (No Funds)†	196	4	-	-
Effort, Funds, Space (No Pubs)	68	1	63	4
Funds, Space, Pubs (Less than 20 percent Effort)	261	5	116	7
Funds, Pubs (No Space, Less than 20 percent Effort)	399	7	45	3
Pubs Only	440	8	0	0
Funds Only	331	6	17	1
Others	1975	37	48	3
Total	5394	100	1753	100

†Designated as active researchers.

*The original version of this criterion as published in reference 1 required 33.3 percent effort in research. The 20 percent figure was adopted in the refined criterion because it permitted most principal investigators to qualify as active researchers.

D. Characteristics of the Training Experience

Of the 5,604 respondents to the research training survey, 4,200 reported that they had received post-doctoral research training. The descriptions of training that follow are based on data provided by these 4,200 individuals.

As indicated by the length of the questionnaire (see Appendix A), many characteristics define the research training experience. In this section the responses to the questionnaire are described, and those characteristics which merit further analysis are highlighted. For purposes of organization, this discussion is divided into six parts which follow the questionnaire:

1) Setting, Duration and Funding of Training Program.
2) Structure of Training.
3) Elements of Training.
4) Immediate Consequences of Training.
5) Restrospective Assessments of Training.
6) Background Data.

1. Setting, Duration and Funding of Training Program

As seen in Table 11, medical schools were the primary institution of training across all degree categories--nearly seventy-five percent of the respondents were trained at medical schools. The National Institutes of Health trained 8.9 percent of the respondents, and the Veterans Administration (VA), universities and foreign institutions each trained slightly over four percent.

Table 11
Distribution of Training Institution by Degree

Training Institution	MD		MD-PhD		PhD		All Degrees	
	N	%	N	%	N	%	N	%
Medical School	2760	77.3	192	60.0	193	62.1	3145	74.9
VA	159	4.5	7	2.2	4	1.3	170	4.1
University	92	2.6	34	10.6	57	18.3	183	4.4
Pharm Co	-	-	2	.6	2	.6	4	.1
NIH	338	9.5	28	8.8	8	2.6	374	8.9
Federal Lab	39	1.1	1	.3	4	1.3	44	1.1
Independent Lab	33	.9	4	1.3	10	3.2	47	1.1
Foreign	97	2.7	50	15.6	27	8.7	174	4.1
Other	45	1.3	2	.6	6	1.9	53	1.3
Missing	6	.2	-		-		6	.1
TOTAL	3569	100.0	320	100.0	311	100.0	4200	100.0

Table 12 shows the duration of training for respondents by degree. Of the MDs, 41.1 percent had one to two years of training. The MD-PhDs and PhDs showed a tendency towards longer training: 32.8 percent of the former and 35.1 percent of the latter had three or more years of training. The length of time in training was considered a crucial factor in assessing later success as a researcher.

Table 12

Duration of Post-Doctoral Research Training by Degree

Duration of Training	MD		MD-PhD		PhD		All Degrees	
	N	%	N	%	N	%	N	%
Less than 6 mos.	158	4.4	5	1.6	11	3.5	174	4.1
6 mos. - 1 yr	362	10.1	19	5.9	12	3.9	393	9.4
1 yr - 2 yrs	1465	41.1	88	27.5	84	27.0	1637	39.0
2 yrs - 3 yrs	1097	30.7	102	31.9	88	28.3	1287	30.6
Over 3 yrs	454	12.7	105	32.8	109	35.1	668	15.9
Missing	33	.9	1	.3	7	2.3	41	1.0
TOTAL	3569	100.0	320	100.0	311	100.0	4200	100.0

Figure 1

Cumulative Frequency Distribution of Duration of Training by Degree

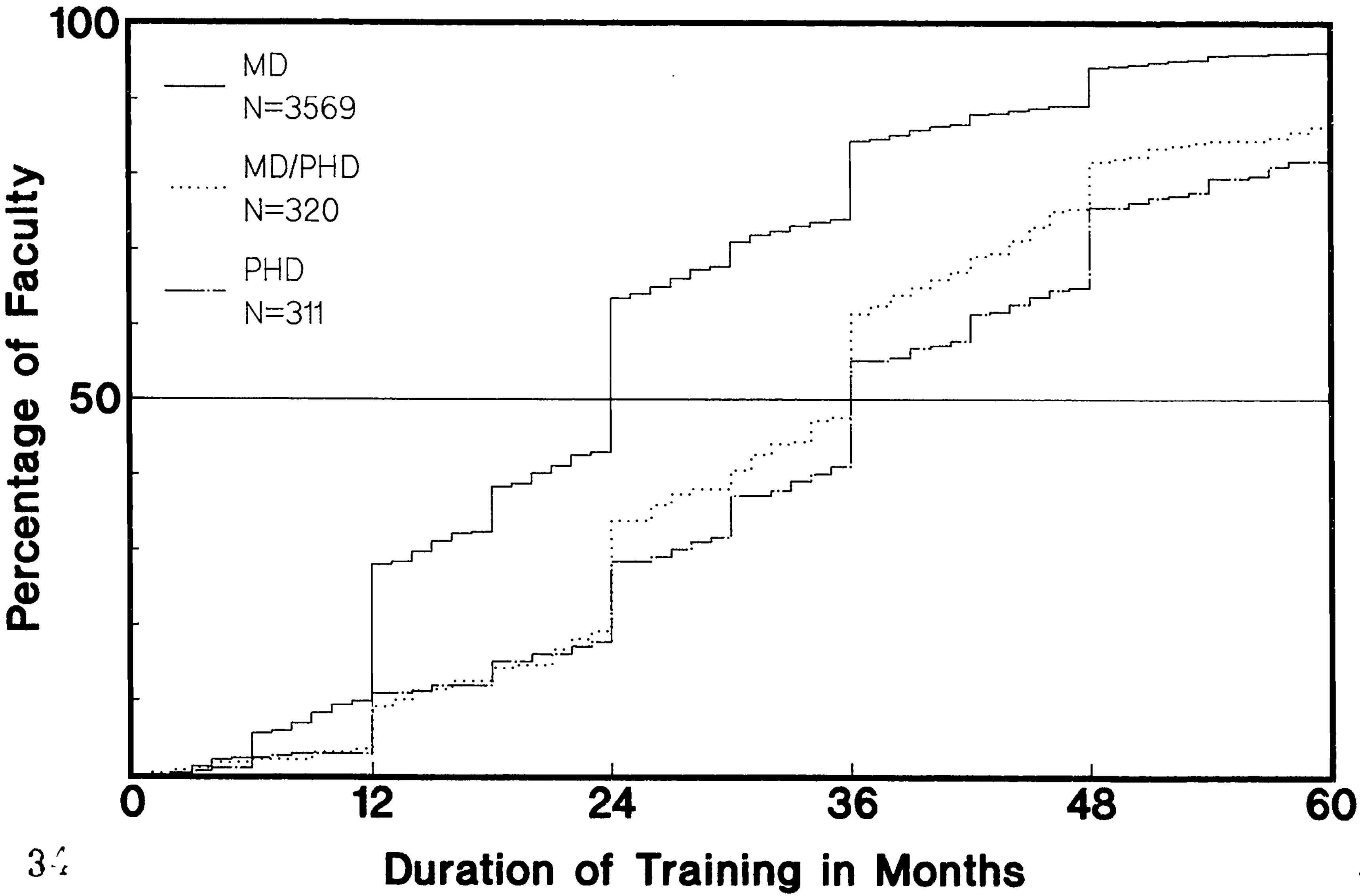

Figure 1 shows the cumulative frequency distributions of duration of training for MDs, MD-PhDs, and PhDs. The median duration of training for MD-PhDs and PhDs was half again as long as the median for MDs--36 months as compared to 24 months.

As Table 13 shows, NIH was by far the predominant source of funding for the respondents' training. Some 72.0 percent of the PhDs, 57.6 percent of the MDs, and 48.4 percent of the MD-PhDs received training support from NIH. No other single funding source accounts for even ten percent of the training support. The opinion of the Task Force was that further analysis should be conducted to determine whether or not this is a factor in later success as a researcher.

Table 13
Distribution of Source of Support for Training by Degree

Source of Support	MD		MD-PhD		PhD		All Degrees	
	N	%	N	%	N	%	N	%
NIH	2055	57.6	155	48.4	224	72.0	2434	58.0
Pharm Co.	63	1.8	7	2.2	3	1.0	73	1.7
VA	190	5.3	9	2.8	3	1.0	202	4.8
Other Hospital	203	5.7	15	4.7	2	.6	220	5.2
AHA	97	2.7	2	.6	3	1.0	102	2.4
ACS	45	1.3	11	3.4	3	1.0	59	1.4
Other	698	19.6	102	31.9	55	17.7	855	20.4
Unknown	172	4.8	12	3.8	10	3.2	194	4.6
Missing	46	1.3	7	2.2	8	2.6	61	1.5
TOTAL	3569	100.0	320	100.0	311	100.0	4200	100.0

The final question in this section was in regard to supplemental income during training. Among MDs, 54.9 percent supplemented their income during training. Of these, 60.5 percent did patient care; 9.8 did other work; 14.2 percent had loans; and 15.6 percent depended on spousal support. Among MD-PhDs, 49.7 percent supplemented their income; 57.0 percent by means of patient care; 10.8 other work; 13.3 percent loans; and 19.0 spousal support. The percentage of PhDs who supplemented their income was 41.2 percent. Unlike MDs, PhDs relied most heavily on spousal support (53.2 percent), equally on loans and other work (23.0 percent), and rarely on patient care (0.6 percent).

2. Structure of the Training Program

Respondents were asked to describe the extent of supervision and how time was allocated during training. One would expect to find in the typical training program that supervision would be more frequent at the earlier stages of training and taper off as time in training increased. For individuals with one year of training or more this pattern is evident. For those with less than one year of training, the pattern is slightly different, but this might be explained by the fact that the questionnaire did not provide for a month-by-month description. Table 14 shows the frequency of supervision of trainees over a three-year period.

Figure 2 describes how activities were allocated in the typical research training program of respondents. Laboratory work was by far the single most time-consuming activity, with MDs spending 47.8 percent of their time in the lab, MD-PhDs 53.9 percent and PhDs 72.8 percent. The related activities of data analysis and literature review also accounted for sizable portions of training time. MDs spent 16.3 percent, MD-PhDs 16.6 percent, and PhDs 21.4 percent of their time in these activities on the average.

In addition to these directly research-oriented activities, patient care and teaching also consumed fair portions of time for MDs and MD-PhDs. MDs were engaged in patient-care for 28.3 percent, MD-PhDs 16.8 percent and PhDs 1.4 percent of the time. Teaching accounted for 4.4 percent of MDs' time, 3.6 percent of MD-PhDs' time and 2.0 percent of PhDs' time.

Elective and required courses were highest among MD-PhDs, who spent 9.1

Table 14
Frequency of Data and Experimental Design Review
With Mentor by Degree and Year

	MDs						MD-PhDs						PhDs					
	Year 1		Year 2		Year 3		Year 1		Year 2		Year 3		Year 1		Year 2		Year 3	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Several Times Daily	153	4.3	22	.9	4	.3	11	3.4	6	2.2	2	.9	11	3.5	3	1.1	-	-
Daily	899	25.2	320	13.0	58	4.7	76	23.8	31	11.3	9	4.1	73	23.6	29	11.3	12	6.3
Weekly	1035	29.0	879	35.8	168	13.5	146	45.6	112	40.7	46	20.8	140	45.1	96	36.9	38	20.1
Less than Weekly	857	24.0	622	25.3	213	17.1	78	24.4	79	28.7	62	28.1	82	26.4	81	31.0	56	29.6
Not at All	532	14.9	590	24.0	789	63.5	4	1.0	44	16.0	100	45.2	1	.2	50	19.4	83	44.0
Missing	93	2.6	25	1.0	11	.9	5	1.6	3	1.1	2	.9	4	1.3	1	.3	-	-
TOTAL	3569	100.0	2458	100.0	1243	100.0	320	100.0	275	100.0	221	100.0	311	100.0	260	100.0	189	100.0

Figure 2

Average Time Allocation During Research Training

MDs Only

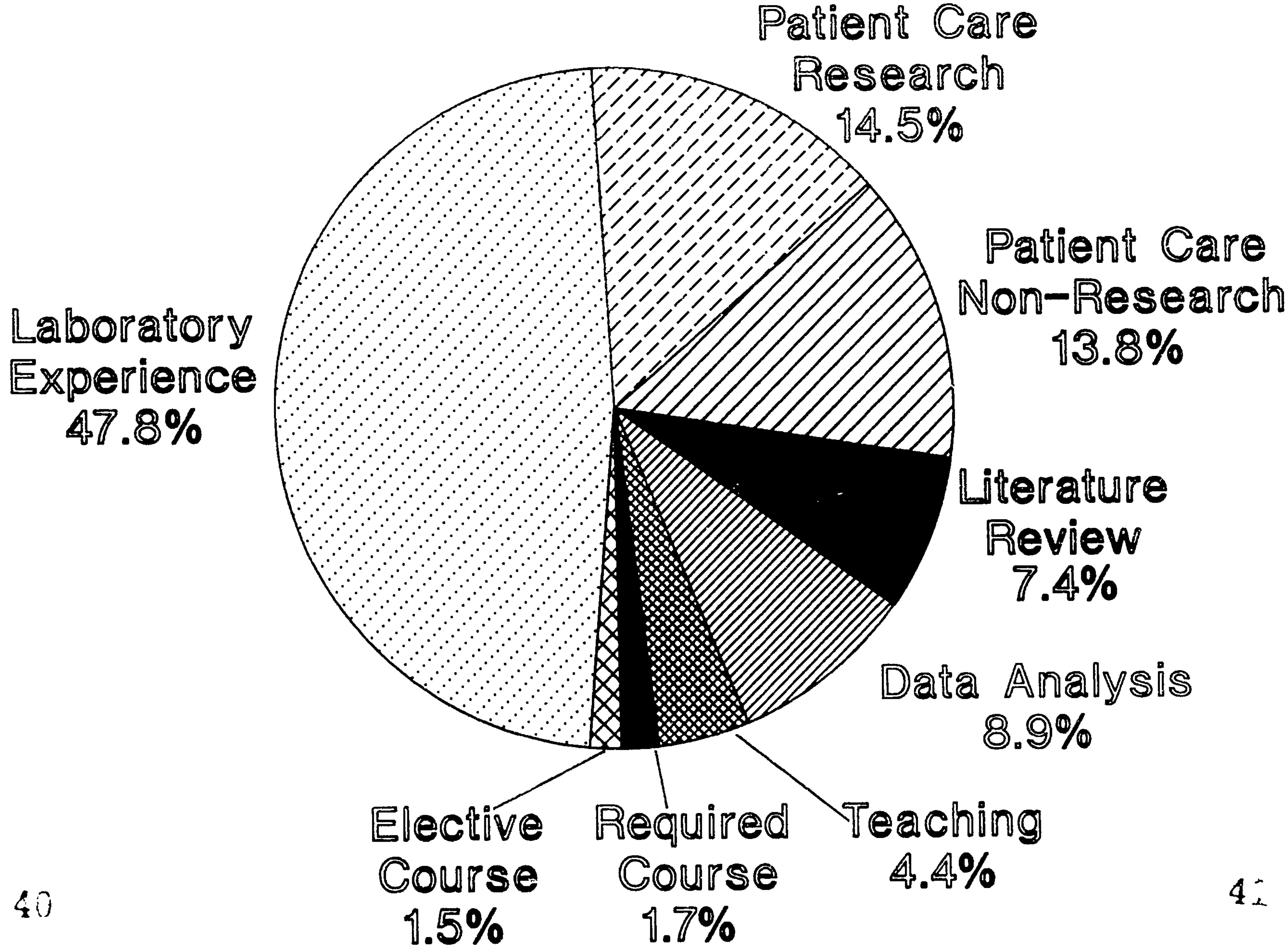

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Figure 2

Average Time Allocation During Research Training

MD–PhD

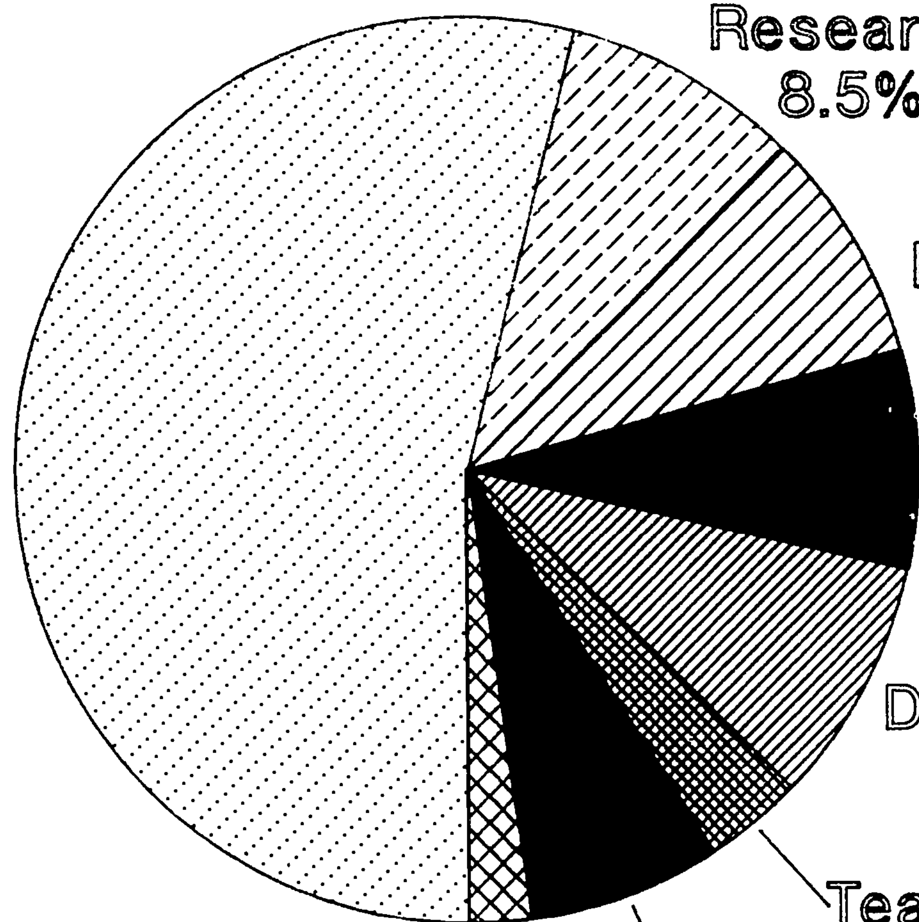
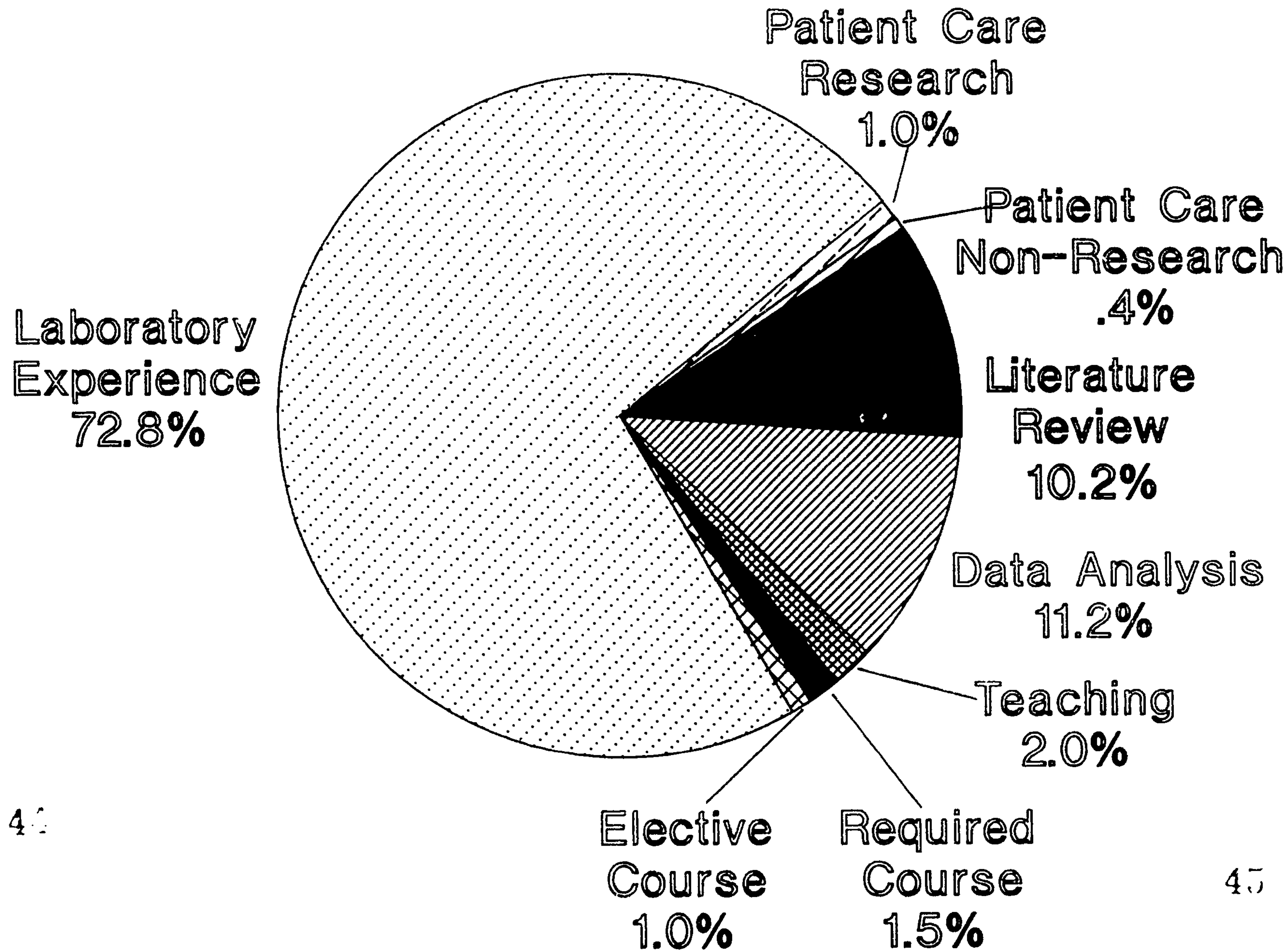


Figure 2

Average Time Allocation During Research Training

PhDs Only



percent of their time in those activities in contrast to 3.2 percent for MDs and 2.5 percent for PhDs.

It was the consensus of the Task Force that the laboratory work and related activities of literature review and data analysis were the most critical factors in assessing the relationship between the structure of the training program and subsequent research success.

3. Elements of the Research Training Program

The topics covered by "elements of the research training program" included (1) use of clinical research centers (CRCs) (2) assignment of laboratory space during training, and (3) the content of formal coursework taken during training.

Some 35.8 percent of the MD respondents, 35.3 percent of the MD-PhDs, and 9.0 percent of the PhDs reported that they had used CRCs during training. CRC usage is discussed more fully in Appendix E.

Approximately 82.3 percent of the MDs, 93.7 percent of the MD-PhDs, and 88.5 percent of the PhDs reported having had assigned laboratory space (either exclusive or shared) during training.

Only 44.1 percent of the MDs had taken any formal coursework during training, as compared to 64.4 percent of the MD-PhDs and 28.6 percent of the PhDs. Of those who took courses, 52.1 percent received instruction in math and statistics either exclusively or with other subjects. The comparable figures for other fields of study were 52.8 percent in physical sciences, 16.3 percent in medical or technical writing, 24.9 percent in basic sciences, and 21.9 percent in computer science. Altogether, 56.5 percent of those taking formal coursework received instruction in two or more subjects.

4. Immediate Consequences of Training

Respondents were asked a series of questions regarding what they considered to be the impact of their training experience. The first two questions dealt with the presentation or publication of research findings. Among MDs, 85.5 percent had presented papers or posters at national meetings as a consequence of their training. The corresponding figures for MD-PhDs and PhDs were 91.8 percent and 90.2 percent, respectively. Those reporting that their training had led to the publication of original articles included 88.2 percent of the MDs, 95.9 percent of the MD-PhDs, and 90.9 percent of the PhDs.

Table 15 shows numbers and percentages of respondents who have been principal investigators on peer-reviewed grants by degree. Nearly sixty percent of the MDs with training became principal investigators. Among MD-PhDs, 61.3 percent of those with training became PIs. Of the PhDs with training, 57.6 percent were or had been PIs.

Table 15
Distribution of Principal Investigators on
Peer-Reviewed Grants from All Sources, by Degree

	MD		MD-PhD		PhD		All Degrees	
	N	%	N	%	N	%	N	%
PI	2126	59.6	196	61.3	179	57.6	2501	59.5
Never PI	1443	40.4	124	38.7	132	42.4	1699	40.5
TOTAL	3569	100.0	320	100.0	311	100.0	4200	100.0

5. Retrospective Assessments of Training

When asked if the training experience had properly prepared them for research, 77.4 percent of the MDs, 95.6 percent of the MD-PhDs and 93.5 percent of the PhDs responded in the affirmative.

When asked to make recommendations for improving the training programs, the majority of respondents indicated that more emphasis was needed in the following areas:

- math and statistical coursework (67.9 percent of MDs, 49.6 percent of MD-PhDs, 54.3 percent of PhDs).
- specific research techniques (58.2 percent of MDs, 50.8 percent of MD-PhDs, 51.8 percent of PhDs).
- data processing and computer science (74.7 percent of MDs, 64.1 percent of MD-PhDs, 67.5 of PhDs).

Recommedations for decreased emphasis were made only with regard to patient care, and this only by the MDs, 65.3 percent of whom indicated that the emphasis in this area had been excessive. By contrast, 86.4 percent of the MD-PhDs and 76.2 percent of the PhDs felt that the time allocated to patient care should stay the same.

The majority of respondents reported that their training programs had been adequate with regard to:

- length of training (61.0 percent of MDs, 75.1 percent of MD-PhDs, 73.5 percent of PhDs).
- basic science coursework (50.0 percent of MDs, 81.7 percent of MD-PhDs, 69.6 percent of PhDs).
- laboratory experience (68.6 percent of MDs, 88.1 percent of MD-PhDs, 77.9 percent of PhDs).
- time with mentor (63.5 percent of MDs, 60.0 percent of MD-PhDs, 67.9 percent of PhDs).
- clinical investigation (73.7 percent of MDs, 74.8 percent of MD-PhDs, 74.0 percent of PhDs).
- administration (52.4 percent of MDs, 39.5 percent of MD-PhDs, 47.2 percent of PhDs).
- medical/technical writing (61.0 percent of MDs, 54.3 percent of MD-PhDs, 63.3 percent of PhDs).
- humane treatment of animals (83.9 percent of MDs, 85.8 percent of MD-PhDs, 82.8 percent of PhDs).

By and large respondents were satisfied with their training experience, although there seems to be a recognized need for some structured coursework in statistics, research techniques, and data processing.

Respondents were also asked to indicate what experiences had most influenced them to undertake research training. The responses were rank ordered as follows:

	MD	MD-PhDs	PhDs
Outstanding Professor/Mentor	35.5 (1)	25.1 (1)	17.1 (2)
Medical School	23.3 (2)	22.8 (2)	-
Residency	15.7 (3)	7.3 (6)	-
Other Influences	12.2 (4)	10.5 (5)	13.7 (4)
Undergraduate School	9.1 (5)	14.9 (3)	14.6 (3)
Family	3.2 (6)	6.7 (7)	3.5 (5)
Graduate School	1.1 (7)	12.6 (4)	51.1 (1)

Outstanding professors or mentors were a strong influence for the largest number, closely followed by medical school for the MDs and graduate school for the PhDs.

6. Background Data

The first question in the "background" section deals with supervised research experience during medical school. Among MDs who had post-doctoral research training, 56.5 percent also had some form of research training during medical school. Of these, 29.6 percent received the training in the form of elective coursework and 6.8 percent as part of their regular curriculum. Some 26.7 cited summer jobs and 5.8 percent other experiences as the source of this training, while 31.1 percent reported a combination of experiences. Among MDs who had no post-doctoral research training, 40.8 percent had received training during medical school. Among this group, the sources of the training were: elective coursework for 26.0 percent, regular curriculum for 11.3 percent, summer jobs for 32.8 percent, other sources for 5.4 percent, and a combination of experiences for 24.5 percent.

The second series of questions dealt with current experiences in laboratory and clinical research. Nearly 88.2 percent of the MDs, 85.6 percent of the MD-PhDs, and 93.9 percent of the PhDs were engaged in either clinical or laboratory research at the time of the survey.

E. Research Training and Success as a Researcher

Following a series of meetings in which the findings on the characteristics of training programs were discussed in detail, the Task Force by consensus selected four of these characteristics to be used in the next phase of the analysis. These four characteristics are:

- source of support for training.
- training institution.
- duration of training.
- amount of time spent in laboratory work during training.

In accordance with these guidelines, this subsection presents and discusses crosstabulations of the foregoing list of four training characteristics with three career outcomes selected for use as measures of research success:

- whether the respondent is or has been a principal investigator on a peer-reviewed grant.
- time between training and first peer-reviewed grant.
- whether the respondent meets the criterion developed in this study for designation as an active researcher.

Each of the crosstabulations is presented separately for each of the three degree categories.

1. Research Training of Principal Investigators and Non-Principal Investigators

The ability to become a principal investigator on a peer-reviewed grant is considered to be one way to assess success as a researcher. Table 16 shows the relationship between research training and becoming a principal investigator. Among MDs, 59.6 percent of the individuals who were trained became PIs, as compared to 38.3 percent of those who had no training. MD-PhDs and PhDs with post-doctoral training were at least three times as likely to be investigators as those without.

Individuals who were supported during training by NIH, the VA, the American Heart Association and the American Cancer Society were the most successful in becoming principal investigators across all degree categories. As shown in Table 17, fewer than half the faculty whose training had been supported by other hospitals were principal investigators.

Table 18 shows the relationship between the training institution and becoming a principal investigator. Among MDs, individuals trained at medical schools were the most successful, closely followed by those trained at VA facilities. About half of the MDs who had trained at NIH were PIs. MDs trained at universities were the least successful of MD respondents in becoming PIs.

Among MD-PhDs, those who had trained at federal laboratories, NIH, and the VA were the most likely to be PIs. Those trained at medical schools, the VA, and independent laboratories were the most successful among PhDs.

Table 19 shows the relationship between duration of training and whether respondents were principal investigators. Across all degree categories, the likelihood of being a PI increased with length of training, at least up to three years, except for those individuals with less than six months of training. MDs and MD-PhDs with two to three years of training more often became principal investigators, while the percentage becoming researchers dropped off slightly beyond the three-year mark. PhDs with more than three years of training were more likely to become PIs.

Finally, Table 20 shows the relationship between being a principal investigator and the average time spent in laboratory work during training.

Table 16
Distribution of Principal Investigators by
Degree and Research Training

	MD					MD-PhD					PhD					All Degrees				
	Never PIs		Are or Were PIs		% PIs	Never PIs		Are or Were PIs		% PIs	Never PIs		Are or Were PIs		% PIs	Never PIs		Are or Were PIs		% PIs
	N	%	N	%		N	%	N	%		N	%	N	%		N	%	N	%	
Had Research Training	1443	66.3	2126	82.4	59.6	124	83.2	196	96.6	61.3	132	56.7	179	92.7	57.6	1699	66.4	2501	84.0	59.5
No Research Training	732	33.7	454	17.6	38.3	25	16.8	7	3.4	21.9	101	43.3	14	7.3	12.2	858	33.6	475	16.0	35.6
TOTAL	2175	100.0	2580	100.0	54.3	149	100.0	203	100.0	57.7	233	100.0	193	100.0	45.3	2557	100.0	2976	100.0	53.8

Table 17
Principal Investigators by Degree and Source of Support for Training

	MD			MD-PhD			PhD			All Degrees		
Source of Training Support	Never PIs	Are or Were PIs	% PIs	Never PIs	Are or Were PIs	% PIs	Never PIs	Are or Were PIs	% PIs	Never PIs	Are or Were PIs	% PIs
NIH	749	1306	63.5	52	103	66.4	86	138	61.6	887	1547	63.6
Pharm Co	30	33	52.4	4	3	42.9	1	2	66.7	35	38	52.0
VA	67	123	64.7	2	7	77.8	3	-	-	72	130	64.4
Other Hosp	116	87	42.9	8	7	46.7	2	-	-	126	94	42.7
Am Heart	31	66	68.0	2	..	-	-	3	100.0	33	69	67.6
Am Cancer	14	31	68.9	4	7	63.6	-	3	100.0	18	41	69.5
Other	317	381	54.6	38	64	62.7	26	29	52.7	381	474	55.4
Unknown	79	93	54.1	9	3	25.0	6	4	40.0	94	100	51.5
Missing	40	6	13.0	5	2	28.6	8	-	-	53	8	13.1
TOTAL	1443	2126	59.6	124	196	61.3	132	179	57.6	1699	2501	59.5

Table 18
Principal Investigators by Degree and Institution of Training

Institution of Training	MD Never PIs	MD Are or Were PIs	MD % PIs	MD-PhD Never PIs	MD-PhD Are or Were PIs	MD-PhD % PIs	PhD Never PIs	PhD Are or Were PIs	PhD % PIs	All Degrees Never PIs	All Degrees Are or Were PIs	All Degrees % PIs
Med School	1044	1716	62.2	75	117	60.9	75	118	61.1	1194	1951	62.0
VA	66	93	58.5	2	5	71.4	1	3	75.0	69	101	59.4
University	51	41	44.6	12	22	64.7	27	30	52.6	90	93	50.8
Pharm Co	-	-	-	1	1	50.0	1	1	50.0	2	2	50.0
NIH	170	168	49.7	8	20	71.4	4	4	50.0	182	192	51.3
Fed Lab	19	20	51.3	-	1	100.0	2	2	50.0	21	23	52.3
Ind Lab	16	17	51.5	2	2	50.0	4	6	60.0	22	25	53.2
Foreign	49	48	49.5	23	27	54.0	14	13	48.1	86	88	50.6
Other	23	22	48.9	1	1	50.0	4	2	33.0	28	25	47.2
Missing	5	1	16.7	-	-	-	-	-	-	5	1	16.7
TOTAL	1443	2126	59.6	124	196	61.3	132	179	57.6	1699	2501	59.5

Table 19
Principal Investigators by Degree and Duration of Training

Duration of Training	MD Never PIs	MD Are or Were PIs	MD % PIs	MD-PhD Never PIs	MD-PhD Are or Were PIs	MD-PhD % PIs	PhD Never PIs	PhD Are or Were PIs	PhD % PIs	All Degrees Never PIs	All Degrees Are or Were PIs	All Degrees % PIs
Less than 6 mos.	80	78	49.4	1	4	80.0	2	9	81.8	83	91	52.3
6 mos. - 1 yr	181	181	50.0	11	8	42.1	6	6	50.0	198	195	49.6
1 yr - 2 yrs	676	789	53.9	49	39	44.3	43	41	48.8	768	869	53.1
2 yrs - 3 yrs	309	788	71.8	26	76	74.5	39	49	55.7	374	913	70.9
Over 3 yrs	167	287	63.2	36	69	65.7	35	74	67.9	238	430	64.4
Missing	30	3	9.1	1	-	-	7	-	-	38	3	7.3
TOTAL	1443	2126	59.6	124	196	61.3	132	179	57.6	1699	2501	59.5

Most MDs who had spent at least 50 percent of their time in the lab during training were PIs. For MD-PhDs and PhDs the portions of time spent in laboratory work during training were nearly equal for PIs and non-PIs. Those who had been NIH-supported trainees and who became PIs generally had spent more time in the lab during training than their non-PI counterparts.

Table 20
Average Time Spent in Laboratory Work During Training by Degree, Source of Training Support, and Whether Respondents Have Ever Been Principal Investigators

	MD		MD-PhD		PhD	
	Never PI	Are or Were PI	Never PI	Are or Were PI	Never PI	Are or Were PI
NIH	48.8	54.3	57.2	58.0	73.1	74.2
Pharm Co	29.9	46.8	80.0	53.8	90.0	97.5
VA	38.1	38.4	37.5	40.7	73.3	-
Other Hosp	26.9	39.1	47.1	50.5	67.5	-
Am Heart	36.6	43.6	2.0	-	-	63.3
Am Cancer	35.4	64.7	70.0	43.9	-	84.5
Unknown	40.4	45.6	56.1	48.6	73.2	64.9
Missing	25.0	28.8	20.0	.0	25.0	-
TOTAL	42.8	50.1	54.7	53.4	73.8	72.0

2. Time Between Training and First Peer-Reviewed Grant

The time elapsed between completion of training and first grant award is another important measure of this relationship between training and subsequent research activity. Table 21 shows the average time between training and receipt of the first peer-reviewed grant for PIs by source of training support. Overall, the interval from the end of training until the first grant averaged slightly over two years. For MDs, the average was 24.5 months. MD-PhDs averaged 24.4 months and PhDs received their first grant an average of just under 22 months after completing their training. The averages among the NIH-trained were approximately 23 months for MDs, 19 months for PhDs, and 27 months for MD-PhDs.

Table 21
Principal Investigators and Mean Time in Months to First Grant by Degree and Source of Support for Training

Source of Support for Training	MDs PIs N	MDs PIs %	MDs Mean Time to 1st Grant	MD-PhDs PIs N	MD-PhDs PIs %	MD-PhDs Mean Time to 1st Grant	PhDs PIs N	PhDs PIs %	PhDs Mean Time to 1st Grant	All Degrees PIs N	All Degrees PIs %	All Degrees Mean Time to 1st Grant
NIH	1306	61.4	23.3	103	52.6	26.7	138	77.1	19.4	1547	61.9	23.4
Pharm Co	33	1.6	20.6	3	1.5	16.0	2	1.1	20.0	38	1.5	20.2
VA	123	5.8	16.8	7	3.6	5.6	-	-	-	130	5.2	16.1
Other Hosp	87	4.1	32.5	7	3.6	22.7	-	-	-	94	3.8	31.8
Am Heart	66	3.1	17.6	-	-	-	3	1.7	1.0	69	2.8	16.8
Am Cancer	31	1.5	14.9	7	3.6	16.3	3	1.7	90.0	41	1.6	19.6
Other	381	17.9	29.9	64	32.7	25.3	29	16.2	25.6	474	19.0	29.0
Unknown	93	4.4	34.9	3	1.5	28.3	4	2.2	59.0	100	4.0	36.0
Missing	6	.3	17.4	2	1.0	1.0	-	-	-	8	.3	12.7
TOTAL	2126	100.0	24.5	196	100.0	24.4	179	100.0	21.8	2501	100.0	24.3

Table 22
Principal Investigators and Mean Time in Months to First Grant by Degree and Institution of Training

Training Institution	MDs PIs N	MDs PIs %	MDs Mean Time to 1st Grant	MD-PhDs PIs N	MD-PhDs PIs %	MD-PhDs Mean Time to 1st Grant	PhDs PIs N	PhDs PIs %	PhDs Mean Time to 1st Grant	All Degrees PIs N	All Degrees PIs %	All Degrees Mean Time to 1st Grant
Med School	1716	80.7	24.3	117	59.7	25.0	118	65.9	19.6	1951	78.0	24.1
VA	93	4.4	15.2	5	2.6	3.3	3	1.7	55.3	101	4.0	15.9
University	41	1.9	15.8	22	11.2	34.5	30	16.8	26.8	93	3.7	22.9
Pharm Co	-	-	-	1	.5	12.0	1	.6	16.0	2	.8	14.0
NIH	168	7.9	30.8	20	10.2	22.9	4	2.2	14.0	192	7.7	29.7
Fed Lab	20	.9	35.9	1	.5	48.0	2	1.1	16.0	23	.9	34.2
Ind Lab	17	.8	22.9	2	1.0	1.0	6	3.4	34.5	25	1.0	24.9
Foreign	48	2.3	35.7	27	13.8	21.4	13	7.3	19.9	88	3.5	28.1
Other	22	1.0	19.7	1	.5	24.0	2	1.1	9.0	25	1.0	19.0
Missing	1	.1	12.0	-	-	-	-	-	-	1	.4	12.0
TOTAL	2126	100.0	24.5	196	100.0	24.4	179	100.0	21.8	2501	100.0	24.3

Table 23
Principal Investigators and Mean Time in Months to First Grant by Degree and Duration of Training

Duration	MDs PIs N	MDs PIs %	MDs Mean Time to 1st Grant	MD-PhDs PIs N	MD-PhDs PIs %	MD-PhDs Mean Time o 1st Grant	PhDs PIs N	PhDs PIs %	PhDs Mean Time to 1st Grant	All Degrees PIs N	All Degrees PIs %	All Degrees Mean Time to 1st Grant
Less than 6 mos.	78	3.7	24.7	4	2.0	5.3	9	5.0	10.8	91	3.6	21.8
6 mos-1 yr	181	8.5	32.8	8	4.1	30.2	6	3.4	50.2	195	7.8	33.6
1-2 yrs	789	37.1	27.5	39	19.9	22.6	41	22.9	26.5	869	34.7	27.2
2-3 yrs	788	37.1	23.0	76	38.8	20.7	49	27.4	28.4	913	36.5	23.1
Over 3 yrs	287	13.5	17.1	69	35.2	23.1	74	41.3	13.5	430	17.2	17.4
Missing	3	.1	12.0	-	-	-	-	-	-	3	.1	12.0
TOTAL	2126	100.0	24.5	196	100.0	24.4	179	100.0	21.8	2501	100.0	24.3

Table 22 shows the distributions of the same outcome variables by training institution. It is noteworthy that individuals trained in VA institutions received their first grant sooner on the average (15.9 months after the end of training) than individuals trained at NIH (29.7 months).

Table 23 shows the relationship between duration of training and average time to receipt of first grant. When the training experience was six months long or longer, there was an inverse correlation between duration of training and time to first award; that is, the longer the training, the sooner the first peer-reviewed grant. This general tendency is seemingly contradicted by the fact that faculty with less than six months of training tend to have received their first peer-reviewed grant sooner than the average. This apparent contradiction may be partly explained by the fact that some individuals apply for grants prior to training and curtail their training when a grant is awarded.

3. Research Training of Researchers and Non-Researchers

Using the criterion developed to define the active researcher--at least 20 percent effort, authored or co-authored at least one original publication, and has either assigned research space or funds--Table 24 shows the distribution of researchers by degree and whether or not they had research training. Among MDs, slightly more than half (50.8 percent) of those who had received training met the criterion for designation as active researchers. By contrast, only 15.2 percent of those without training were active researchers. Indeed, 91.0 percent of the MD researchers had research training. MD-PhDs and PhDs also exhibit differences in the percentage of researchers between those with and without post-doctoral training (65.9 to 43.8 for MD-PhDs and 78.5 to 56.5 for PhDs), although these differences are not nearly as dramatic as those seen among the MDs.

Table 24
Distribution of Researchers and Non-Researchers
by Degree and Research Training

	MD					MD-PhD					PhD					All Degrees				
	Non Rsch		Rsch		% Rsch	Non Rsch		Rsch		% Rsch	Non Rsch		Rsch		% Rsch	Non Rsch		Rsch		% Rsch
	N	%	N	%		N	%	N	%		N	%	N	%		N	%	N	%	
Had Research Training	1757	63.6	1812	91.0	50.8	109	85.8	211	93.8	65.9	67	57.3	244	79.0	78.5	1933	64.3	2267	89.7	54.0
No Research Training	1006	36.4	180	9.0	15.2	18	14.2	14	6.2	43.8	50	42.7	65	21.0	56.5	1074	35.7	259	10.3	19.4
TOTAL	2763	100.0	1992	100.0	41.9	127	100.0	225	100.0	63.9	117	100.0	309	100.0	72.5	3007	100.0	2526	100.0	45.7

Table 25 shows numbers and percentages of respondents who are currently active researchers by degree, by source of training support. As one can readily see in this table, a larger percentage of NIH-supported trainees as compared to those supported by other organizations are designated currently active researchers across all degree categories. Although the Veterans Administration (VA) supported fewer trainees, more than half of the current faculty who had VA-supported training are designated active researchers.

Table 26 shows numbers and percentages of internal medicine faculty who are currently active researchers by training institution. Respondents trained at NIH, universities, and foreign institutions are more likely to be researchers than those trained at medical schools or VA hospitals.

Table 27 shows numbers and percentages of active researchers by duration of training. Among MDs and MD-PhDs currently holding faculty appointments, those who trained for longer periods are more likley to be active researchers. The same tendency is evident for PhDs with some relatively minor divergence.

Table 28 reveals a positive correlation between duration of training and the likelihood of being a researcher among those whose training was NIH-funded, except for those trained for more than three years. Furthermore, MDs with more than one year of training who were supported by NIH are generally more likely to be researchers than MDs with a similar length of training who were not supported by NIH.

As noted in the preceding section, laboratory experience was the main activity to which time was allocated during training. Table 29 shows the average time spent in laboratory work for researchers and non-researchers by source of support for training. On the whole, respondents who became researchers tend to have spent more time in laboratory work during training than those who did not become researchers. American Heart Association trainees are the exception. Alumni of NIH-supported training with MD or

Table 25
Distribution of Researchers and Non-Researchers
by Degree and Source of Support for Training

	MD			MD-PhD			PhD			All Degrees		
Source of Support	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch
NIH	938	1117	54.4	42	113	72.9	44	180	80.4	1024	1410	57.9
Pharm Co	42	21	33.3	4	3	42.9	1	2	66.7	47	26	35.6
VA	92	98	51.6	3	6	66.7	2	1	33.3	97	105	52.0
Other Hosp	105	98	48.3	8	7	46.7	-	2	100.0	113	107	48.6
Am Heart	51	46	47.4	-	2	100.0	1	2	66.7	52	50	49.0
Am Cancer	25	20	44.4	8	3	27.3	1	2	66.7	34	25	42.4
Other	379	319	45.7	36	66	64.7	16	39	70.9	431	424	49.6
Unknown	100	72	41.9	7	5	41.7	1	9	90.0	108	86	44.3
Missing	25	21	45.6	1	6	85.7	1	7	87.5	27	34	55.7
TOTAL	1757	1812	50.8	109	211	65.9	67	244	78.5	1933	2267	54.0

Table 26
Distribution of Researchers and Non-Researchers by Degree
and Institution of Training

	MD			MD-PhD			PhD			All Degrees		
Training Institution	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch
Med School	1382	1378	49.9	68	124	64.6	42	151	78.2	1492	1653	52.6
VA	81	78	49.1	3	4	57.1	-	4	100.0	84	86	50.6
University	47	45	48.9	12	22	64.7	13	44	77.2	72	111	60.7
Pharm Co.	-	-	-	-	2	100.0	1	1	50.0	1	3	75.0
NIH	122	216	63.9	5	23	82.1	2	6	75.0	129	245	65.5
Fed Lab	22	17	43.6	-	1	100.0	1	3	75.0	23	21	47.7
Ind Lab	22	11	33.3	1	3	75.0	2	8	80.0	25	22	46.8
Foreign	48	49	50.5	20	30	60.0	5	22	81.5	73	101	58.0
Other	29	16	35.6	-	2	100.0	1	5	83.3	30	23	43.4
Missing	4	2	33.3	-	-	-	-	-	-	4	2	33.3
TOTAL	1757	1812	50.8	109	211	65.9	67	244	78.5	1933	2267	54.0

Table 27
Distribution of Researchers and Non-Researchers
by Degree and Duration of Training

Duration of Training	MD			MD-PhD			PhD			All Degrees		
	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch
Less than 6 months	102	56	35.4	4	1	20.0	4	7	63.6	110	64	36.8
6 mos - 1 yr	223	139	38.4	8	11	57.9	1	11	91.7	232	161	41.0
1 yr - 2 yrs	767	698	47.6	31	57	64.8	22	62	73.8	820	817	49.9
2 yrs - 3 yrs	459	638	58.2	36	66	64.7	16	72	81.8	511	776	60.3
Over 3 yrs	189	265	58.4	30	75	71.4	24	85	78.0	243	425	63.6
Missing	17	16	48.5	-	1	100.0	-	7	100.0	17	24	58.5
TOTAL	1757	1812	50.8	109	211	65.9	67	244	78.5	1933	2267	54.0

Table 28
Distribution of Researchers and Non-Researchers
Who Were NIH-Supported During Training by Degree and Duration of Training

Duration of Training	MD			MD-PhD			PhD			All Degrees		
	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch
Less than 6 months	26	13	33.3	1	1	50.0	1	1	50.0	28	15	34.9
6 months - 1 year	326	256	44.0	9	20	69.0	12	24	66.7	347	300	46.4
1 - 2 years	408	586	59.0	11	44	80.0	11	61	84.7	430	691	61.6
2 - 3 years	126	206	62.0	13	26	66.7	7	47	87.0	146	279	64.1
Over 3 years	28	31	52.5	5	20	80.0	6	35	85.4	39	86	68.8
Missing	24	25	51.0	3	2	40.0	7	12	63.2	34	39	53.4
Total	938	1117	54.4	42	113	72.9	44	180	80.4	1024	1410	57.9

Table 29

Average Percentage of Time Spent in Laboratory Work During Training, by Degree and Source of Training Support

	Average of Percentage Time Spent in Laboratory Work							
	MD		MD-PhD		PhD		ALL DEGREES	
Source of Support	Non Rsch	Rsch	Non Rsch	Rsch	Non Rsch	Rsch	Non Rsch	Rsch
NIH	42.9	57.7	55.3	58.6	82.7	71.2	45.2	59.6
Pharm Co.	34.8	44.3	60.0	47.5	90.0	97.5	37.7	48.7
VA	39.5	37.2	25.0	47.5	72.5	75.0	39.7	38.2
Other Hosp	28.3	37.8	51.3	46.3	--	67.5	29.9	39.0
Am Heart	45.5	36.6	--	4.0	100.0	45.0	46.6	36.2
Am Cancer	47.4	65.8	46.3	71.8	89.5	79.5	49.6	67.7
Other	40.4	46.7	49.7	52.5	59.1	73.0	41.9	50.2
Unknown	35.0	33.4	54.3	57.5	35.0	79.4	36.3	38.9
Missing	13.0	32.5	10.0	6.7	10.0	25.0	12.1	21.9
TOTAL	40.7	51.8	51.3	55.0	76.6	71.7	42.6	54.3

MD-PhD degrees who were reseachers had spent significantly more time in laboratory work on the average than did their non-researcher counterparts. NIH-supported PhDs who are active researchers spent less average time in laboratory work than those who are not, but both groups spent a large part of their time in the lab. In general, it appears that the likelihood of being a researcher is positively correlated with amount of laboratory experience during training.

In summary, the likelihood of being a researcher was greater for faculty members whose training had been NIH-supported and continued for two or three years, and for those who spent at least 50 percent of their time during training in the laboratory.

Three outcome measures have been discussed in this section: (1) whether the respondent is or has been a principal investigator on a peer-reviewed grant, (2) time between training and first peer-reviewed grant, and (3) whether the respondent meets the composite criterion for designation as a currently active researcher. Because the first two of these may be structurally related to source of funding and location of training, they appear to be less suitable for studying the relationship between characteristics of the training program and success as a researcher. The composite criterion developed in Wave I was judged to be more useful for this analysis.

F. Research Intensity of Training Institution and Current Place of Employment

Using data from the AAMC Institutional Profile System (IPS), medical schools were sorted into three categories of research intensity (high, medium, and low) by dividing them approximately into thirds (top 40, middle 40, and lower 47) by annual dollar amounts of external research funding.

High-intensity medical schools provided training to 59.5 percent of the

MDs, 44.4 percent of the MD-PhDs and 49.2 percent of the PhDs, as Table 30 shows. Medium- and low-intensity schools trained significantly fewer faculty across all degree categories.

Table 30: Distribution of Faculty by Research Intensity of Training Institution by Degree

Training Institution	MD		MD-PhD		PhD		All Degrees	
	N	%	N	%	N	%	N	%
Med School-High	2123	59.5	142	44.4	153	49.2	2418	57.6
Med School-Medium	459	12.9	34	10.6	31	10.0	524	12.5
Med School-Low	172	4.8	16	5.0	9	2.9	197	4.7
NIH	339	9.5	28	8.8	8	2.6	375	8.9
VA	157	4.4	7	2.2	4	1.3	168	4.0
All Others	319	8.9	93	29.1	106	34.1	518	12.3
TOTAL	3569	100.0	320	100.0	311	100.0	4200	100.0

Approximately 57.5 percent of the internal medicine faculty are currently employed at high-intensity schools. Medium-intensity schools employ 25.5 percent of the faculty, and the remaining 17.0 percent are employed at low-intensity schools. These figures are displayed in Table 31.

Table 31: Distribution of Faculty by Research Intensity of Current Employment Institution by Degree

Research Intensity of Current Institution	MD		MD-PhD		PhD		All Degrees	
	N	%	N	%	N	%	N	%
Med School-High	2044	57.3	184	57.5	186	59.8	2414	57.5
Med School-Medium	902	25.3	82	25.6	86	27.7	1070	25.5
Med School-Low	623	17.5	54	16.9	39	12.5	716	17.0
TOTAL	3569	100.0	320	100.0	311	100.0	4200	100.0

The relationship between the research intensity of the training institution and that of the current place of employment is described in Table 32. For purposes of comparison, only respondents who had trained at medical

Table 32
Distribution of Faculty by Research Intensity of Current Employment Institution by Research Intensity of Training Institution and Degree

Research Intensity of Current Institution	MD						MD-PhD						PhD					
	High		Medium		Low		High		Medium		Low		High		Medium		Low	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
High	1435	67.6	89	19.4	29	16.9	89	62.7	10	29.4	3	18.8	107	69.9	13	41.9	2	22.2
Medium	414	19.5	292	63.6	18	10.5	33	23.2	14	41.2	3	18.8	32	20.9	12	38.7	2	22.2
Low	274	12.9	78	17.0	125	72.7	20	14.1	10	29.4	10	62.5	14	9.2	6	19.4	5	55.6
TOTAL	2123	100.0	459	100.0	172	100.0	142	100.0	34	100.0	16	100.0	153	100.0	31	100.0	9	100.0

Research Intensity of Current Institution	All Degrees					
	High		Medium		Low	
	N	%	N	%	N	%
High	1631	67.5	112	21.4	34	17.3
Medium	479	19.8	318	60.7	23	11.7
Low	308	12.7	94	17.9	140	71.1
TOTAL	2148	100.0	524	100.0	197	100.0

schools are shown in this table.

Overall, 67.5 percent of those trained at high-intensity schools are currently employed by schools in the same category. Likewise, 60.7 percent of those who trained at medium-intensity schools and 71.1 percent of those who trained at low-intensity schools are now employed by schools in the same respective categories.

When these figures are computed separately by degree classification, MDs exhibit a particularly strong correspondence between the research intensity of their training places and that of their places of employment. The correspondence is not as strong among those with other degrees. Only 41.2 percent of the MD-PhDs trained at medium-intensity institutions are employed at similar schools; the remainder are divided evenly between high- and low-intensity schools. PhDs who trained at medium-intensity medical schools also show some divergence: 41.9 percent are employed at high-intensity schools and only 38.7 percent at medium-intensity institutions.

G. Relationship between Source of Support for Training and Source of Support for Research

Whether or not individuals obtain early post-training research funding and maintain support through their faculty careers is an important indicator of their success as researchers.

The data for this segment of the analysis come from two distinct sources: (1) the set of questions about first research grant on the Wave II questionnaire and (2) the ten-year research funding history recorded on the Wave I questionnaire.

Table 33 shows the relationship between source of training support and source of first peer-reviewed grant by degree. Among MDs, nearly 65 percent of those whose training was supported by NIH have been PIs. Of this group

Table 33
Percentage Distribution of Trainees by First Peer-Reviewed Grant Source of Support by Degree and Research Training Source of Support

Research Training Source of Support

Source of Support First Peer-Reviewed Grant	NIH	Pharm Co.	VA	Other Hosp	Amer Heart	Amer Cancer	Other	Unknown	Missing	Total
MD										
NIH	38.5	20.6	13.2	19.2	24.7	31.1	29.9	19.8	8.7	32.3
Pharm Co.	.2	-	.5	-	-	-	.3	1.2	-	.2
VA	7.4	9.5	38.4	6.4	4.1	6.7	6.0	8.1	-	8.6
Am Heart	5.4	4.8	3.2	3.4	33.0	2.2	3.6	4.7	-	5.4
Am Cancer	1.7	1.6	-	1.5	1.0	15.6	.1	2.3	-	1.5
NSF	.2	-	-	-	-	4.4	-	-	-	.2
ADAMHA	.1	-	-	-	-	-	.3	-	-	.1
Other	10.2	15.9	9.5	12.3	5.2	8.9	14.3	18.0	4.3	11.3
Never PI	36.5	47.6	35.3	57.1	32.0	31.1	45.4	45.9	87.0	40.4
PERCENT TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N	2055	63	190	203	97	45	698	172	46	3569
MD-PhD										
NIH	37.4	42.9	11.1	.1	-	36.4	28.4	-	14.3	30.3
Pharm Co.	-	-	-	-	-	-	-	-	-	-
VA	6.5	-	44.4	13.3	-	-	6.9	8.3	-	7.5
Am Heart	4.5	-	-	13.3	-	-	4.9	8.3	-	4.7
Am Cancer	2.6	-	11.1	-	-	9.1	-	-	-	1.9
NSF	1.3	-	-	-	-	9.1	-	-	-	.9
ADAMHA	-	-	-	-	-	-	-	-	-	-
Other	14.2	-	11.1	13.3	-	9.1	22.5	8.3	14.3	15.9
Never PI	33.6	57.1	22.2	53.3	100.0	36.4	37.3	75.0	71.4	38.8
PERCENT TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N	155	7	9	15	2	11	102	12	7	320
PhD										
NIH	39.7	-	-	-	33.3	66.7	20.0	40.0	-	34.4
Pharm Co.	-	-	-	-	-	-	-	-	-	-
VA	1.8	-	-	-	-	-	5.5	-	-	2.3
Am Heart	7.6	-	-	-	33.3	-	5.5	-	-	6.8
Am Cancer	1.3	-	-	-	-	-	1.8	-	-	1.3
NSF	2.2	33.3	-	-	-	-	1.8	-	-	2.3
ADAMHA	.5	-	-	-	-	-	-	-	-	.3
Other	8.5	33.3	-	-	33.3	33.3	18.2	-	-	10.3
Never PI	38.4	33.3	100.0	100.0	-	-	47.3	60.0	100.0	42.4
PERCENT TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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more than 60.1 percent received their first grants from NIH. By comparison, 56.2 percent of those whose training was funded by other sources have been principal investigators and 42.5 percent of these received their first grants from NIH. In fact, 27.7 percent of all non-NIH trainees received their first grant from NIH. Among MD-PhDs whose training was NIH-funded, 66.4 percent have been PIs; 65.4 percent of this group received their first grant from NIH. Of the MD-PhDs whose training was funded by sources other than NIH, 56.4 percent have been PIs; 41.9 percent of these received their first grants from NIH. Of the PhDs whose training was NIH-funded, 61.6 percent have been princpal investigators. Some 64.5 percent of this group received their first grant from NIH. Among the PhDs who did not receive NIH training support the corresponding figures are 47.1 percent and 43.9 percent. These data show a correspondence between source of training support and source of first grant support that cuts across the degree categories and is particularly strong among those whose training was funded by NIH. They also show that NIH has been a major funding source for first grants, even among faculty whose training it did not support.

In Table 34, current sources of research support are crosstabulated with source of training support and degree. Among MDs whose post-doctoral research training was NIH-funded, 53.0 percent are currently PIs. Of these, 61.2 percent have NIH funding. The corresponding figures for MD-PhDs are 63.3 percent and 67.3 percent. Among PhDs, 52.7 percent of those whose training was NIH-funded are PIs on existing grants; 72.5 percent of these have NIH funding.

These findings suggest that faculty whose training support was provided by NIH tend to have relatively strong histories of repeated research funding, particularly from NIH.

Table 35 describes the findings regarding the ten-year research support

Table 34
Distribution of Current Source of Research Support
by Degree and Source of Training Support

Current Research Source of Support	NIH	Pharm Co.	VA	Other Hosp	Amer Heart	Amer Cancer	Other	Unknown	Missing	Total
	Research Training Source of Support									
	MD									
NIH	32.5	12.7	15.8	11.3	16.5	44.4	20.6	14.5	6.5	26.3
ADAMHA	.3	-	-	.5	-	-	.3	-	-	.3
DHHS	.4	-	.5	.5	-	-	1.0	-	-	.5
VA	6.1	7.9	22.6	3.4	8.3	6.7	5.3	6.4	-	6.7
NSF	.0	-	-	-	-	-	-	-	-	.0
Other Federal	.6	-	-	-	-	-	.1	-	-	.4
Foundations, Priv.	5.0	-	4.2	6.4	5.2	2.2	6.0	7.0	-	5.2
Amer Cancer	.7	-	.5	1.0	1.0	2.2	-	.6	2.2	5.6
Amer Heart	1.5	1.6	2.1	2.0	8.3	-	1.2	1.2	-	1.6
Pharm Co.	3.9	9.5	5.3	5.4	5.2	-	4.2	5.2	-	4.2
Other Industry	.6	-	-	1.0	3.1	-	.4	-	-	.6
Other	1.4	-	2.6	1.5	1.0	2.2	2.3	1.2	-	52.2
None	47.0	68.3	46.3	67.0	51.6	42.2	58.6	63.9	91.3	100.0
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N	2055	63	190	203	97	45	698	172	46	3569
	MD-PhD									
NIH	42.6	14.3	44.4	13.3	-	27.3	23.5	8.3	-	31.6
ADAMHA	-	-	-	-	-	-	-	-	-	-
DHHS	-	-	-	6.7	-	9.1	2.0	-	-	[illegible]
VA	5.2	14.3	11.1	13.3	-	-	5.9	8.3	-	5.9
NSF	.7	-	-	6.7	-	-	-	-	-	.6
Other Federal	-	-	-	-	-	-	2.0	-	-	.6
Foundations, Priv.	4.5	4.3	-	-	-	-	2.9	8.3	14.3	[illegible]
Amer Cancer	-	-	-	-	-	-	-	-	-	-
Amer Heart	3.9	-	-	-	-	-	2.0	-	-	2.5
Pharm Co.	4.5	-	11.1	-	-	9.1	2.0	-	-	3.4
Other Industry	.7	-	-	-	-	-	-	-	-	.3
Other	1.3	-	-	-	-	-	4.9	-	14.3	2.5
None	36.8	57.1	33.3	60.0	100.0	54.5	54.9	75.0	71.4	47.2
PERCENT TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N	155	7	9	15	2	11	102	12	7	[illegible]
	PhD									
NIH	38.4	66.7	-	-	66.7	100.0	27.3	30.0	-	35.7
ADAMHA	-	-	-	-	-	-	-	-	-	-
DHHS	.5	-	-	-	-	-	1.8	-	-	.6
VA	2.7	-	-	-	-	-	1.8	-	-	2.3
NSF	.5	-	-	-	-	-	-	-	-	.3
Other Federal	1.3	-	-	-	-	-	-	-	-	[illegible]
Foundations, Priv.	3.1	-	-	-	-	-	5.5	10.0	-	3.5
Amer Cancer	.5	-	-	-	-	-	-	-	-	.3
Amer Heart	1.8	-	-	-	-	-	1.8	-	-	1.6
Pharm Co.	1.3	-	-	-	-	-	-	-	-	[illegible]
Other Industry	.5	-	-	-	-	-	-	-	-	.3
Other	2.2	-	-	-	-	-	1.8	-	-	[illegible]
None	47.3	33.3	100.0	100.0	33.3	-	60.0	60.0	100.0	[illegible]
PERCENT TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	[illegible]
N	224	3	3	2	3	3	55	10	8	[illegible]

Table 35
Continuity of Support for Internal Medicine
Faculty Members Who Are NIH Principal Investigators

	MD		MD-PhD		PhD		All Degrees	
	N	%	N	%	N	%	N	%
Faculty Since 1972	1539	100.0	132	100.0	68	100.0	1739	100.0
Continuously Supported	387	25.1	40	30.3	20	29.4	447	25.7
Formerly Supported	385	25.0	31	23.5	7	10.3	423	24.3
Recently Supported	206	13.4	28	21.2	15	22.1	249	14.3
Never Supported	561	36.5	33	25.0	26	38.2	620	35.7
Faculty Since 1977	775	100.0	77	100.0	90	100.0	942	100.0
Continuously Supported	154	19.9	26	33.8	34	37.8	214	22.7
Formerly Supported	78	10.1	6	7.8	13	14.4	97	10.3
Recently Supported	162	20.8	18	23.3	22	24.5	202	21.5
Never Supported	381	49.2	27	35.1	21	23.3	429	45.5
Faculty Since 1980	622	100.0	67	100.0	94	100.0	783	100.0
Continuously Supported	110	17.7	20	29.9	30	31.9	160	20.4
Formerly Supported	22	3.5	4	6.0	2	2.1	28	3.6
Recently Supported	64	10.3	9	13.4	13	13.8	86	11.0
Never Supported	426	68.5	34	50.7	49	52.1	509	65.0
Faculty Since 1982	633	100.0	44	100.0	59	100.0	736	100.0
Currenty Supported	82	13.0	11	25.0	16	27.1	109	14.8
Not Supported	551	87.0	33	75.0	43	72.9	627	85.2
All Faculty	3569	100.0	320	100.0	311	100.0	4200	100.0
Continuously Supported	733	20.5	97	30.3	100	32.2	930	22.1
Formerly Supported	485	13.6	41	12.8	22	7.1	548	13.0
Recently Supported	432	12.1	55	17.2	50	16.1	537	12.8
Never Supported	1919	53.8	127	39.7	139	44.7	2185	52.0

histories. Overall, approximately 48 percent of all respondents are now NIH-supported researchers or have been at some time in the past.

Among MDs, those who have been faculty members longer are more likely to have received continuous support from NIH throughout the ten-year period. Overall, 20.5 percent of the MDs have been continuously supported by NIH since joining the faculty.

MD-PhDs and PhDs who were faculty members in 1977 are slightly more likely to have been continuously supported as NIH PIs, as compared to those who were faculty members in 1972. Approximately 30.3 percent of the MD-PhDs and 32.2 percent of the PhDs have been continuously supported as NIH PIs. These data indicate a strong relationship between length of employment and continuity of NIH support.

VII. SUMMARY AND CONCLUSIONS

The APM Task Force and the project staff reviewed the survey data and reached consensus on a standard that designates as an active researcher any faculty member who (1) devotes at least 20 percent of his or her effort to research, (2) had published original research findings, and (3) either has external funding for research or assigned laboratory space. While this criterion may misclassify a few of the faculty, it is strongly correlated with other measures of research productivity (e.g., being an NIH principal investigator) and thus is a measure to be used to examine possible relationships with research training antecedents.

The primary use of this criterion was to classify respondents as either active researchers or not, and to determine the characteristics of post-doctoral research training that typify the preparation of active researchers. Since NIH funds the training of a large proportion of all trainees, it was not surprising that NIH had funded the training of a large proportion of those who became active researchers. The main characteristics that appear to be most typical of active researchers' training backgrounds are (1) funding by NIH, (2) training duration of at least one year, and (3) a large share of training time spent in the laboratory. The type of institutions where the training took place has much less impact on current research involvement.

Among those who have received peer-reviewed research grants, there is an inverse relationship between duration of training and the length of time from completion of training to the award of the first grant. There is an anomaly in that while the instances are few, those with less than six months of training received grants earlier, on the average, than those with six months to two years of training.

When medical schools are divided into three categories of research intensity (high, medium, and low), there is a general tendency for faculty to be employed at a school in the same category as the school at which they received their training--assuming, of course, they trained at a medical school. This tendency is stronger among MDs than among MD-PhDs and PhDs.

Comparisons of the sources of respondents' training support to various aspects of their histories as active reseachers reveal that those whose training was NIH-funded tend to have stronger histories of continuous and repeated research funding than those whose training was funded by other organizations. Overall, approximately 48 percent of the respondents are currently NIH PIs or were such at one time.

Although caution is necessary in using retrospective data to draw conclusions about the kinds of research training that tend to produce successful researchers, it is possible to state some general relationships that are consistent both with this study's data and with the conventional wisdom concerning biomedical research. Training that is supported by NIH is a good beginning place for researchers, regardless of where the training takes place. One could not conclude from the data presented here that training funded by other organizations is less valuable to the trainee than that funded by NIH, but no other single organization has supported the training of even one-tenth the number of currently active researchers that NIH has. The typical "successful" research training experience appears to be at least one year in length; in general the rule "the longer, the better" seems to hold. Extensive laboratory experience during training also appears to coincide with a strong likelihood of becoming and remaining a researcher.

The findings presented here by no means exhaust the information available from the two surveys. Future analyses of these data will provide further detail on the research training and activities of internal medicine faculty, and that knowledge about training and research among medical school faculty in general will be further expanded by studies of faculty in other clinical and basic science departments.

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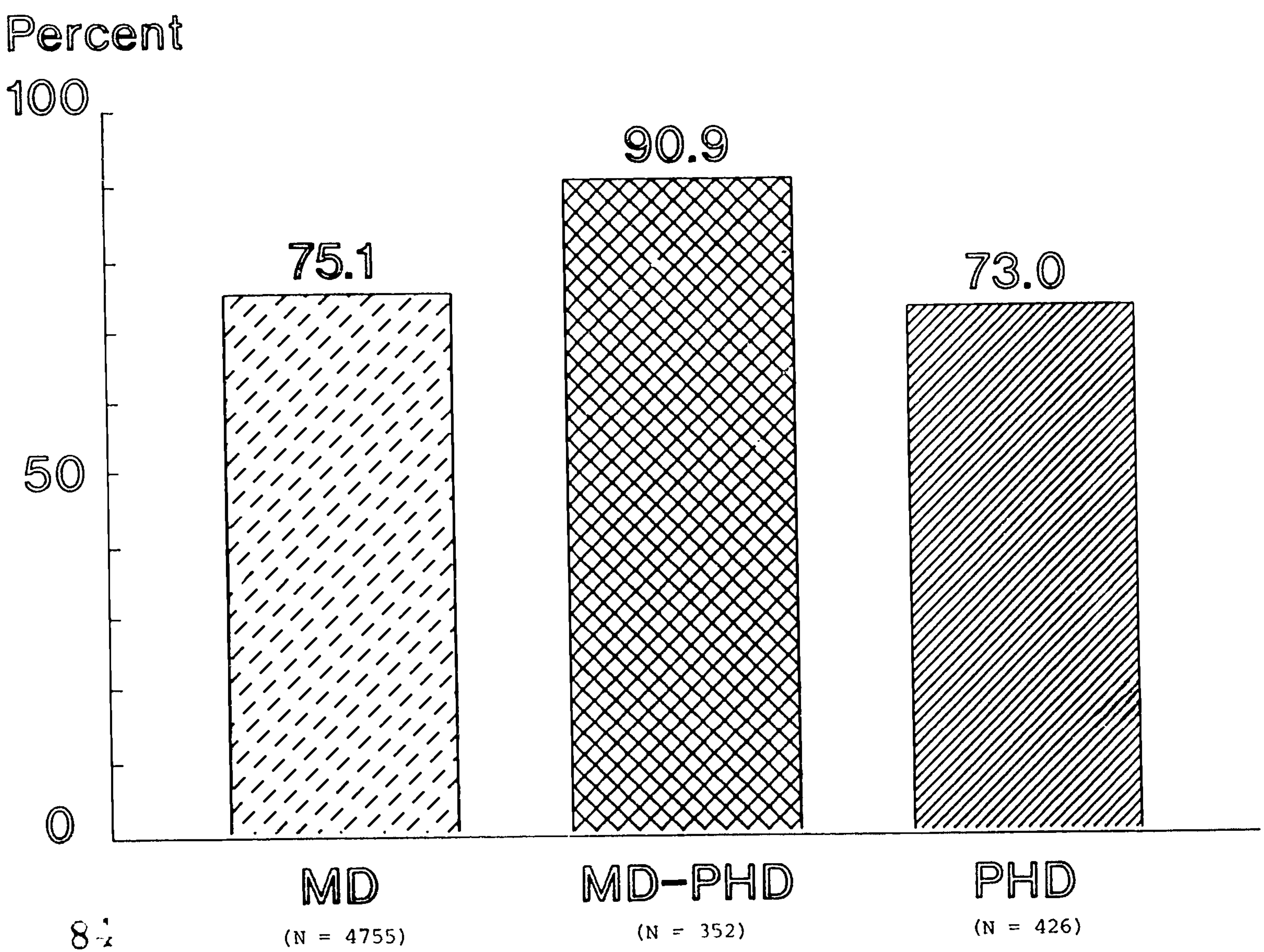
Appendix A

SUPPLEMENTARY TABLES AND FIGURES

QUESTIONNAIRES

Did you ever have Research Training?

(PERCENTAGE ANSWERING "YES")

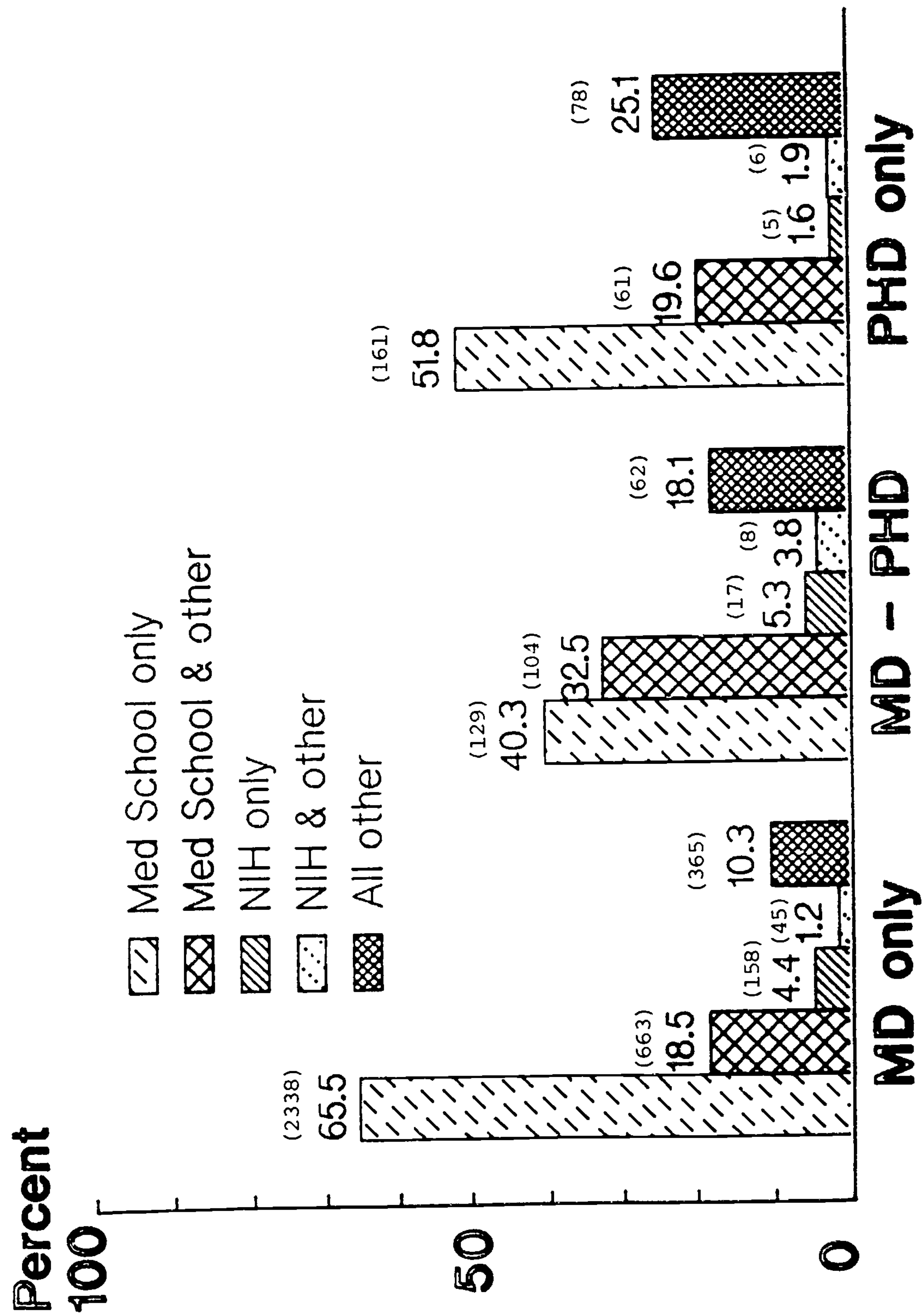


Distribution of Researchers and Non-Researchers
by Degree and Research Training

	MD			MD-PhD			PhD			Total		
	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch
Had Research Training	1757	1812	50.8	109	211	65.9	67	244	78.5	1933	2267	54.0
No Research Training	1006	180	9.0	18	14	43.8	50	65	56.5	1074	259	19.4
TOTAL	2763	1992	41.9	127	225	63.9	117	309	72.5	3007	2526	45.7

ITEM A

Type of Training Institution



Item A
Distribution of Researchers and Non-Researchers
by Degree and Institution of Training

Training Institution	MD Non Rsch	MD Rsch	MD % Rsch	MD-PhD Non Rsch	MD-PhD Rsch	MD-PhD % Rsch	PhD Non Rsch	PhD Rsch	PhD % Rsch	Total Non Rsch	Total Rsch	Total % Rsch
Med School	1382	1378	49.9	68	124	64.6	42	151	78.2	1492	1653	52.6
VA	81	78	49.1	3	4	57.1	-	4	100.0	84	86	50.6
University	47	45	48.9	12	22	64.7	13	44	77.2	72	111	60.7
Pharm Co	-	-	-	-	2	100.0	1	1	50.0	1	3	75.0
NIH	122	216	63.9	5	23	82.1	2	6	75.0	129	245	65.5
Fed Lab	22	17	43.6	-	1	100.0	1	3	75.0	23	21	47.7
Ind Lab	22	11	33.3	1	3	75.0	2	8	80.0	25	22	46.8
Foreign	48	49	50.5	20	30	60.0	5	22	81.5	73	101	58.0
Other	29	16	35.6	-	2	100.0	1	5	83.3	30	23	43.4
Missing	4	2	33.3	-	-	-	-	-	-	4	2	33.3
TOTAL	1757	1812	50.8	109	211	65.9	67	244	78.5	1933	2267	54.0

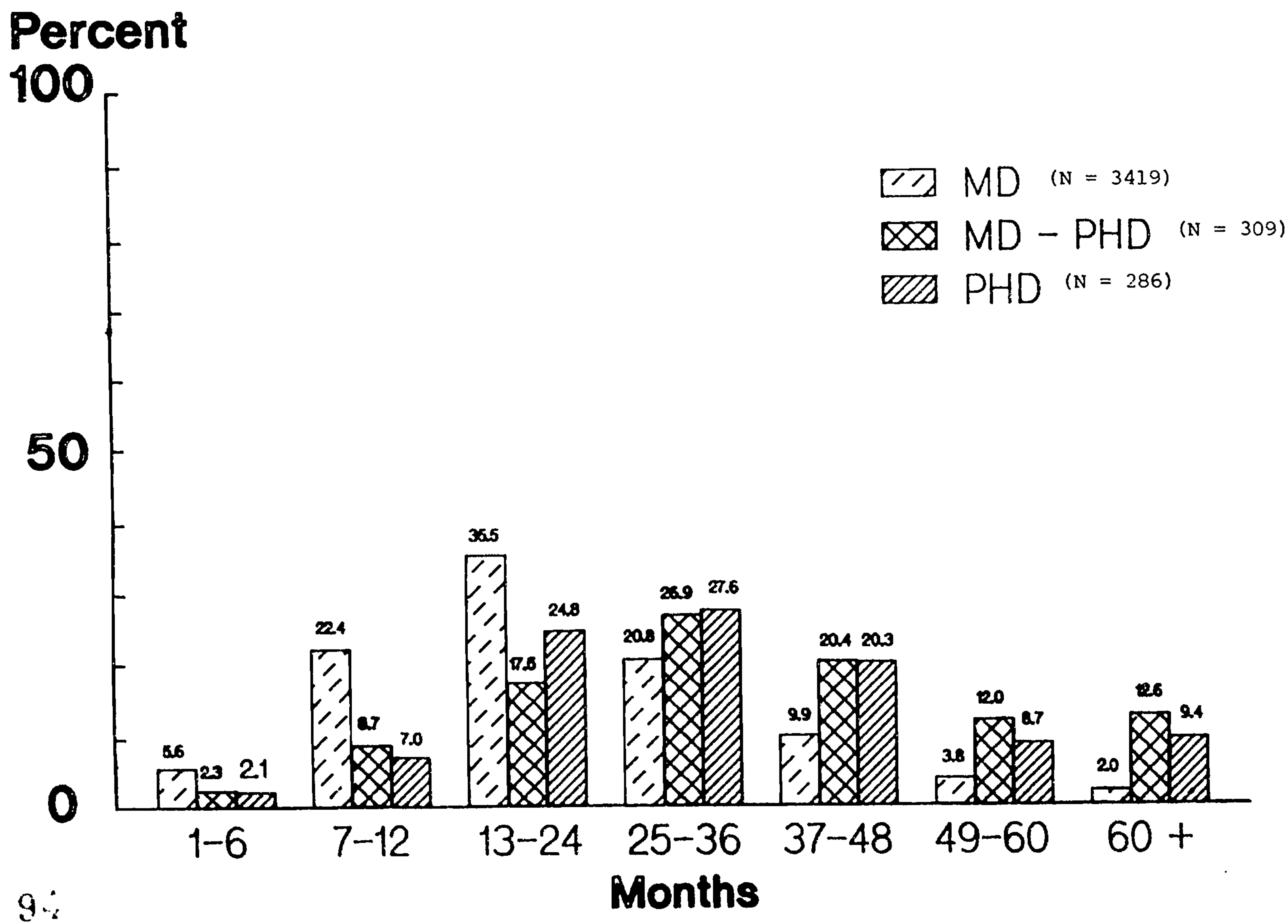
ITEM B: NAME OF INSTITUTION
TOP 25 TRAINING INSTITUTIONS

Name of Institution	Number of Trainees
National Institutes of Health	515
Harvard Medical School	446
Foreign Institutions	407
Johns Hopkins Medical School	144
U. of Washington Medical School	140
Columbia Medical School	129
Washington University - St. Louis	121
U. of Pennsylvania	115
Duke University	113
Yale University	107
UC - San Francisco	105
Cornell	105
Mayo Medical School	86
Tufts	86
NYU	85
UCLA	84
Boston University	80
U. of Minnesota	70
U. of Rochester	64
Stanford	63
U. of Texas - Dallas	62
U. of Michigan	56
U. of Chicago	55
Case Western	53
Rockefeller University	51

ITEM C: NAME OF DEPARTMENT
TOP 20 DEPARTMENTS

Name of Department	Number of Trainees
Medicine	3,862
Biochemistry	245
Physiology	231
Pharmacology	128
Immunology & Microbiology	104
Microbiology	71
Pathology - Basic Science	55
Epidemiology	42
Pathology - Clinical	40
Pediatrics	35
Biology	31
Molecular Biology	31
Chemistry	24
Cellular Biology	23
Surgery	20
Genetics	19
Dermatology	18
Anatomy	18
Physiological Chemistry	17
Virology	17

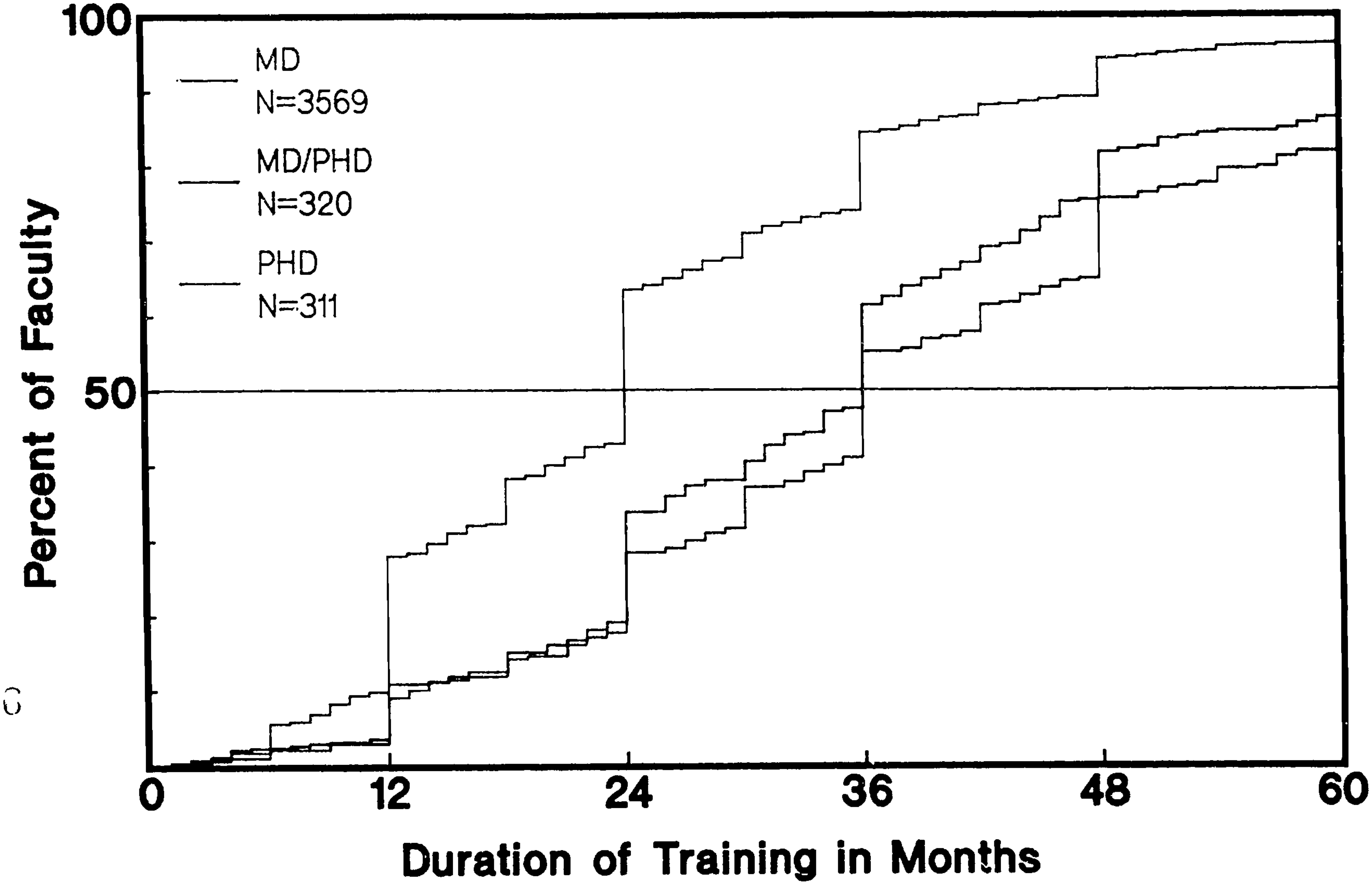
What was the duration of your Formal Research Training?



ITEMS D and E

A7

Internal Medicine Faculty



Items D and E
Distribution of Researchers and Non-Researchers
by Degree and Duration of Training

Duration of Training	MD Non Rsch	MD Rsch	MD % Rsch	MD-PhD Non Rsch	MD-PhD Rsch	MD-PhD % Rsch	PhD Non Rsch	PhD Rsch	PhD % Rsch	Total Non Rsch	Total Rsch	Total % Rsch
Less than 6 months	102	56	35.4	4	1	20.0	4	7	63.6	110	64	36.8
6 mos - 1 yr	223	139	38.4	8	11	57.9	1	11	91.7	232	161	41.0
1 yr - 2 yrs	767	698	47.6	31	57	64.8	22	62	73.8	820	817	49.9
2 yrs - 3 yrs	459	638	58.2	36	66	64.7	16	72	81.8	511	776	60.3
Over 3 yrs	189	265	58.4	30	75	71.4	24	85	78.0	243	425	63.6
Missing	17	16	48.5	-	1	100.0	-	7	100.0	17	24	58.5
TOTAL	1757	1812	50.8	109	211	65.9	67	244	78.5	1933	2267	54.0

Item F: Distribution of Source of Support for Training by Degree

Source of Support	MD N	MD %	MD-PhD N	MD-PhD %	PhD N	PhD %
NIH	2055	57.6	155	48.4	224	72.0
Pharmaceutical Co.	63	1.8	7	2.2	3	1.0
VA Hospital	190	5.3	9	2.8	3	1.0
Other Hospital	203	5.7	15	4.7	2	.6
American Heart Association	97	2.7	2	.6	3	1.0
American Cancer Society	45	1.3	11	3.4	3	1.0
Other	698	19.6	102	31.9	55	17.7
Unknown	172	4.8	12	3.8	10	3.2
Missing	46	1.3	7	2.2	8	2.6
TOTAL	3569	100.0	320	100.0	311	100.0

Item F

Distribution of Researchers and Non-Researchers by Degree and Source of Support for Training

Source of Support	MD			MD-PhD			PhD			Total		
	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch	Non Rsch	Rsch	% Rsch
NIH	938	1117	54.4	42	113	72.9	44	180	80.4	1024	1410	57.9
Pharm Co	42	21	33.3	4	3	42.9	1	2	66.7	47	26	35.6
VA	92	98	51.6	3	6	66.7	2	1	33.3	97	105	52.0
Other Hosp	105	98	48.3	8	7	46.7	-	2	100.0	113	107	48.6
Am Heart	51	46	47.4	-	2	100.0	1	2	66.7	52	50	49.0
Am Cancer	25	20	44.4	8	3	27.3	1	2	66.7	34	25	42.4
Other	379	319	45.7	36	66	64.7	16	39	70.9	431	424	49.6
Unknown	100	72	41.9	7	5	41.7	1	9	90.0	108	86	44.3
Missing	25	21	45.6	1	6	85.7	1	7	87.5	27	34	55.7
TOTAL	1757	1812	50.8	109	211	65.9	67	244	78.5	1933	2267	54.0

Item G: Distribution of Supplemental Income by Degree

Supplemental Income	MD N	MD %	MD-PhD N	MD-PhD %	PhD N	PhD %
None	1609	45.1	161	50.3	183	58.8
Patient Care Only	836	23.4	52	16.3	1	.3
Patient Care & Other Work	49	1.4	10	3.1	-	-
Patient Care & Loan	75	2.1	6	1.9	-	-
Patient Care & Spouse	148	4.1	10	3.1	-	-
P.C., Other Work, Loan	9	.3	-	-	-	-
P.C., Other Work, Spouse	11	.3	3	.9	-	-
P.C., Loan, Spouse	40	1.1	6	1.9	-	-
Other Work Only	137	3.8	10	3.1	19	6.1
Other Work & Loan	15	.4	5	1.6	4	1.3
Other Work & Spouse	18	.5	1	.3	5	1.6
Other Work, Loan, Spouse	20	.6	1	.3	1	.3
Loan Only	190	5.3	15	4.7	13	4.2
Loan & Spouse	86	2.4	6	1.9	16	5.1
Spouse Only	303	8.5	30	9.4	67	21.5
All Methods	10	.3	3	.9	-	-
Missing	13	.4	1	.3	2	.6
TOTAL	3569	100.0	320	100.0	311	100.0

Item G: Distribution of Researchers and Non-Researchers by Supplemental Income

Supplemental Income	MD				MD-PhD				PhD			
	Rsch		Non-Rsch		Rsch		Non-Rsch		Rsch		Non-Rsch	
	N	%	N	%	N	%	N	%	N	%	N	%
None	732	43.2	827	47.1	102	48.3	59	54.1	140	57.4	43	64.2
Patient Care Only	445	24.6	391	22.3	36	17.1	16	14.7	1	.4	-	-
Patient Care & Other Work	29	1.6	20	1.1	10	4.7	-	-	-	-	-	-
Patient Care & Loan	41	2.3	34	1.9	-	-	6	5.5	-	-	-	-
Patient Care & Spouse	93	5.1	55	3.1	6	2.8	4	3.7	-	-	-	-
P.C., Other Work, Loan	6	.3	3	.2	-	-	-	-	-	-	-	-
P.C., Other Work, Spouse	6	.3	5	.3	3	1.4	-	-	-	-	-	-
P.C., Loan, Spouse	20	1.1	20	1.1	5	2.4	1	.9	-	-	-	-
Other Work Only	73	4.0	64	3.6	6	2.8	4	3.7	16	6.6	3	4.5
Other Work & Loan	11	.6	4	.2	3	1.4	2	1.8	2	.8	2	3.0
Other Work & Spouse	6	.3	12	.7	1	.5	-	-	3	1.2	2	3.0
Other Work, Loan, Spouse	10	.6	10	.6	1	.5	-	-	-	-	1	1.5
Loan Only	86	4.7	104	5.9	9	4.3	6	5.5	11	4.5	2	3.0
Loan & Spouse	46	2.5	40	2.3	5	2.4	1	.9	12	4.9	4	6.0
Spouse Only	141	7.8	162	9.2	20	9.5	10	9.2	57	23.4	10	14.9
All Methods	6	.3	4	.2	3	1.4	-	-	-	-	-	-
Missing	11	.6	2	.1	1	.5	-	-	2	.8	-	-
TOTAL	1812	100.0	1757	100.0	211	100.0	109	100.0	244	100.0	67	100.0

ITEM H

FREQUENCY OF REVIEW OF DATA AND EXPERIMENTAL DESIGN WITH MENTOR BY DEGREE AND YEAR

	MDs						MD-PhDs						PhDs					
	Year 1		Year 2		Year 3		Year 1		Year 2		Year 3		Year 1		Year 2		Year 3	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Several Times Daily	153	4.3	22	.9	4	.3	11	3.4	6	2.2	2	.9	11	3.5	3	1.1	-	-
Daily	899	25.2	320	13.0	58	4.7	76	23.8	31	11.3	9	4.1	73	23.6	29	11.3	12	6.3
Weekly	1035	29.0	879	35.3	168	13.5	146	45.6	112	40.7	46	20.8	140	45.1	96	36.9	38	20.1
Less than Weekly	857	24.0	622	25.3	213	17.1	78	24.4	79	28.7	62	28.1	82	26.4	81	31.0	56	29.6
Not at All	532	14.9	590	24.0	789	63.5	4	1.0	44	16.0	100	45.2	1	.2	50	19.4	83	44.0
Missing	93	2.6	25	1.0	11	.9	5	1.6	3	1.1	2	.9	4	1.3	1	.3	-	-
TOTAL	3569	100.0	2458	100.0	1243	100.0	320	100.0	275	100.0	221	100.0	311	100.0	260	100.0	189	100.0

ITEM I: MEAN TIME ALLOCATION DURING RESEARCH TRAINING

Training Experiences	N = 3569 MD	N = 320 MD-PhD	N = 311 PhD
Patient Care-Research	14.5	8.5	1.0
Patient Care-Non Research	13.8	8.3	.4
Formal Required Courses	1.7	6.9	1.5
Elective Courses	1.5	2.2	1.0
Teaching	4.4	3.6	2.0
Laboratory Experience	47.8	53.9	72.8
Data Analysis	8.9	8.8	11.2
Literature Review	7.4	7.8	10.2
TOTAL	100.0	100.0	100.0

Item I: Distribution of Researchers and Non-Researchers by Mean Time Allocation During Training

	MD		MD-PhD		PhD	
Training Experience	Rsch	Non-Rsch	Rsch	Non-Rsch	Rsch	Non-Rsch
Patient Care-Research	12.2	15.9	7.3	10.4	1.3	1.7
Patient Care-Non-Research	13.9	12.9	7.7	8.6	.4	.6
Formal Required Courses	1.3	1.8	7.0	6.5	1.2	2.7
Elective Courses	1.7	1.4	1.9	2.6	.8	1.6
Teaching	3.9	4.8	2.8	4.5	2.0	1.9
Laboratory Experience	51.5	46.6	56.5	53.1	71.3	75.6
Data Analysis	8.4	8.9	8.9	7.8	12.2	7.5
Literature Review	7.1	7.7	7.9	6.5	10.8	8.4
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Item J: Use of a Clinical Research Center

Type of Clinical Research Center	MD		MD-PhD		PhD	
	N	%	N	%	N	%
NIH	966	27.1	81	25.3	14	4.5
VA	50	1.4	3	.9	3	1.0
Other	202	5.7	19	5.9	11	3.5
NIH & VA	6	.2	-	-	-	-
NIH & Other	44	1.2	10	3.1	-	-
VA & Other	8	.2	-	-	-	-
None	2146	60.1	188	58.8	225	72.3
Missing	147	4.1	19	5.9	58	18.6
TOTAL	3569	100.0	320	100.0	311	100.0

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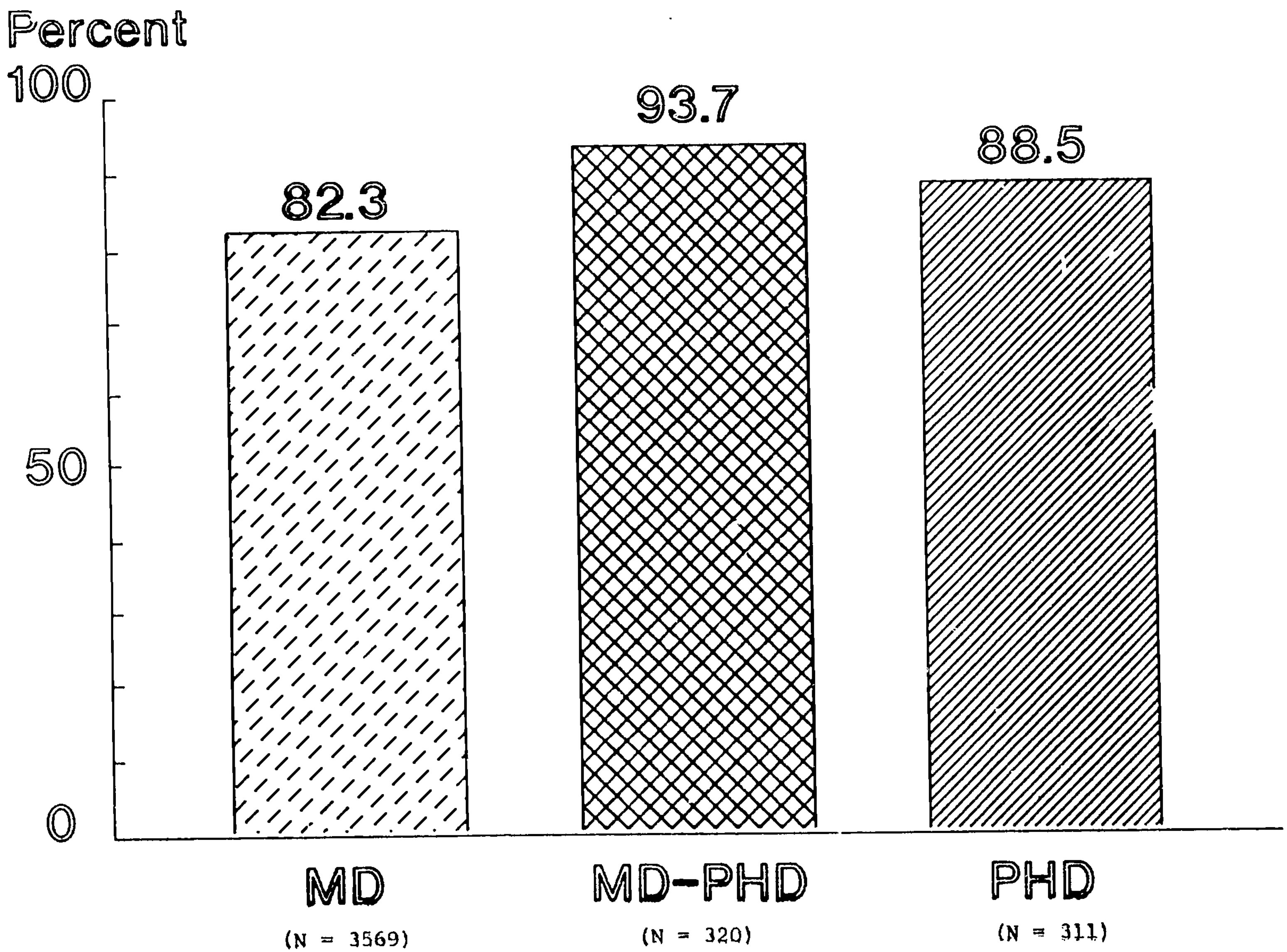
Item J: Distribution of Researchers and Non-Researchers by Clinical Research Center

Type of Clinical Research Center	MD				MD-PhD				PhD			
	Rsch		Non-Rsch		Rsch		Non-Rsch		Rsch		Non-Rsch	
	N	%	N	%	N	%	N	%	N	%	N	%
NIH	544	30.0	422	24.0	57	27.0	24	22.0	11	4.5	3	4.5
VA	23	1.3	27	1.5	-	-	3	2.8	2	.8	1	1.5
Other	73	4.0	129	7.3	13	6.2	6	5.5	10	4.1	1	1.5
NIH & VA	4	.2	2	.1	-	-	-	-	-	-	-	-
NIH & Other	23	1.3	21	1.2	10	4.7	-	-	-	-	-	-
VA & Other	3	.2	5	.7	-	-	-	-	-	-	-	-
None	1046	57.7	1100	62.6	121	57.3	67	61.5	172	70.5	53	79.1
Missing	96	5.3	51	2.9	10	4.7	9	8.3	49	20.1	9	13.4
TOTAL	1812	100.0	1757	100.0	211	100.0	109	100.0	244	100.0	67	100.0

Did you have Laboratory Space assigned to you?



Item K: Distribution of Researchers and Non-Researchers by Laboratory Space

	MD				MD-PhD				PhD			
	Rsch		Non-Rsch		Rsch		Non-Rsch		Rsch		Non-Rsch	
	N	%	N	%	N	%	N	%	N	%	N	%
Had Laboratory Space	1493	82.4	1444	82.2	192	91.0	108	99.1	211	86.5	64	95.5
No Space Assigned	319	17.6	313	17.8	19	9.0	1	.9	33	13.5	3	4.5
TOTAL	1812	100.0	1757	100.0	211	100.0	109	100.0	244	100.0	67	100.0

ITEM L: LABORATORY WORK INVOLVED ANIMALS

	MDs		MD-PhDs		PhDs	
	#	%	#	%	#	%
Research Did Not Involve Animals	1279	35.8	87	27.2	108	34.7
Instructed in Humane Treatment	1649	46.2	181	56.6	155	49.8
Not Instructed	502	14.1	44	13.8	41	13.2
Missing	139	3.9	8	2.5	7	2.3
TOTAL	3569	100.0	320	100.0	311	100.0

ITEM M: INSTRUCTOR IN HUMANE TREATMENT OF ANIMALS AND AVERAGE HOURS OF INSTRUCTION

Instructor	MD #	MD %	MD-PhD #	MD-PhD %	PhD #	PhD %
Mentor	861	43.9	95	52.5	68	43.9
Veterinarian	110	6.7	13	7.2	16	10.3
Other	370	22.4	39	21.5	40	25.8
Mentor & Vet	155	9.4	23	12.7	15	9.7
Mentor & Other	102	6.2	5	2.8	7	4.5
Vet & Other	8	.5	2	1.1	7	4.5
All	39	2.4	4	2.2	1	.7
Missing	4	.2	-	-	1	.7
TOTAL	1649	100.0	181	100.0	311	100.0

	MD	MD-PhD	PhD
Average Hours of Instruction	2.01	2.02	2.07

ITEM N: FORMAL COURSEWORK DURING TRAINING

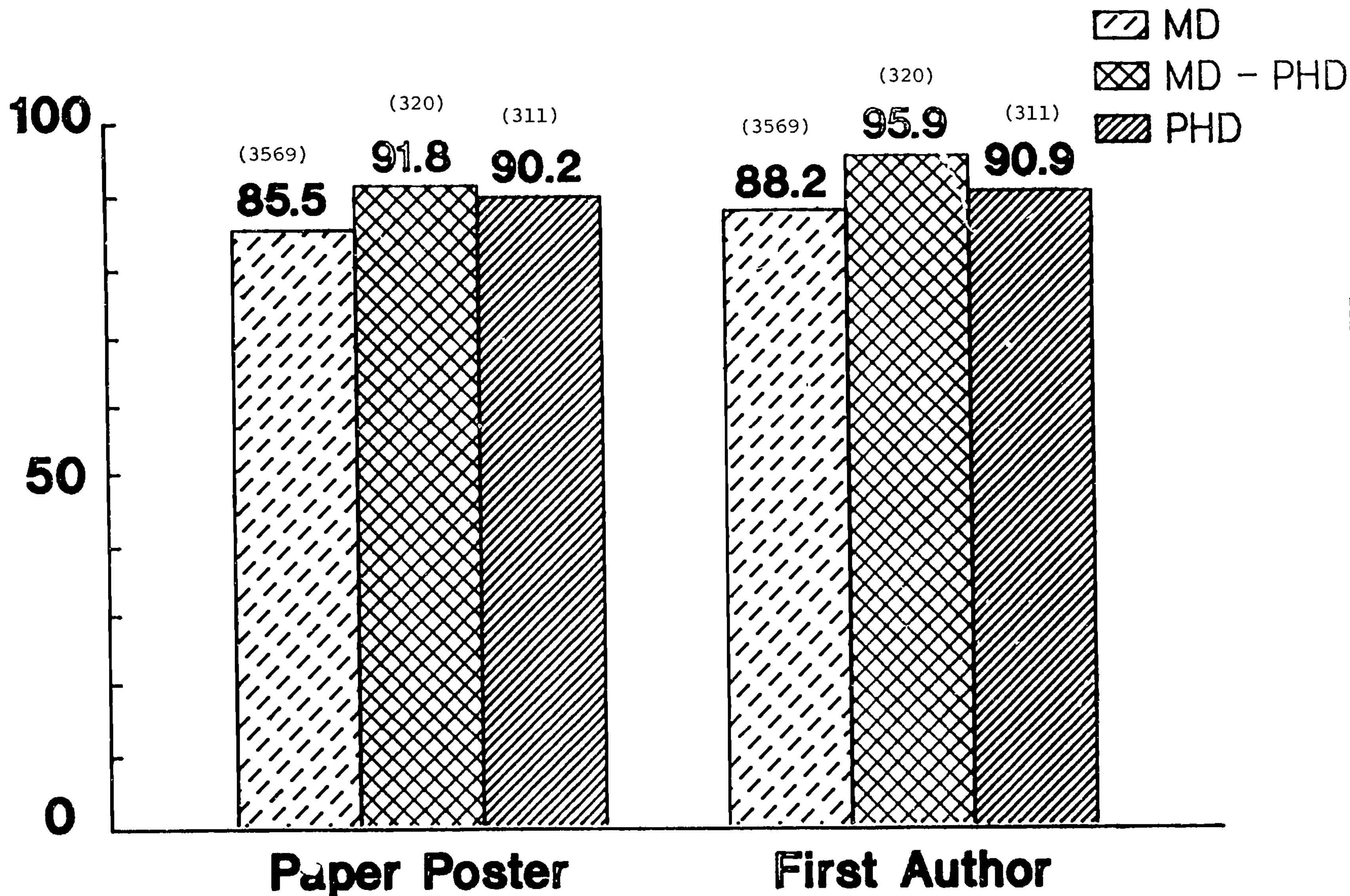
Coursework	MD #	MD %	MD-PhD #	MD-PhD %	PhD #	PhD %
None	1994	55.9	114	35.6	222	71.4
Math & Statistics	244	6.8	11	3.4	5	1.6
Physical Sciences	79	2.2	1	.3	6	1.9
Med/Tech Writing	25	.7	1	.3	2	.6
Basic Med Sciences	346	9.7	28	8.8	19	6.1
Computer Sciences	36	1.0	1	.3	10	3.2
2 of the Above	471	13.2	58	18.1	22	7.1
3 of the Above	231	6.5	55	17.2	17	5.5
4 of the Above	101	2.8	37	11.6	6	1.9
All of the Above	42	1.2	14	4.4	2	.6
TOTAL	3569	100.0	320	100.0	311	100.0

Item N: Distribution of Researchers and Non-Researchers by Formal Coursework During Training

	MD				MD-PhD				PhD			
	Rsch		Non-Rsch		Rsch		Non-Rsch		Rsch		Non-Rsch	
Coursework	N	%	N	%	N	%	N	%	N	%	N	%
None	1026	56.6	968	55.1	91	38.4	33	30.3	176	72.1	46	68.7
Math & Statistics	126	7.0	118	6.7	8	3.8	3	2.8	2	.8	3	4.5
Physical Sciences	36	2.0	43	2.4	1	.5	-	-	4	1.6	2	3.0
Med/Tech Writing	10	.6	15	.8	1	.5	-	-	-	-	2	3.0
Basic Med Sciences	176	9.7	170	9.7	14	6.6	14	12.8	15	6.1	4	6.0
Computer Sciences	15	.8	21	1.2	-	-	1	.9	8	3.3	2	3.0
2 of the Above	212	11.7	259	14.7	41	19.4	17	15.6	22	9.0	-	-
3 of the Above	130	7.2	101	5.7	40	19.0	15	13.8	17	7.0	-	-
4 of the Above	58	3.2	43	2.4	16	7.6	21	19.3	-	-	6	9.0
All of the Above	23	1.3	19	1.1	9	4.3	5	4.6	-	-	2	3.0
TOTAL	1812	100.0	1757	100.0	211	100.0	109	100.0	244	100.0	67	100.0

ITEMS O and P

What was the impact of your Research Training Experience?



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Items O and P: Distribution of Researcher and Non-Researcher by Impact of Training Experience

	MD				MD-PhD				PhD			
	Rsch		Non-Rsch		Rsch		Non-Rsch		Rsch		Non-Rsch	
	N	%	N	%	N	%	N	%	N	%	N	%
Present Paper/Poster	1665	91.9	1376	78.3	195	92.4	99	90.8	221	90.6	59	88.1
No Presentation	147	8.1	381	21.7	16	7.6	10	9.2	23	9.4	8	11.9
TOTAL	1812	100.0	1757	100.0	211	100.0	109	100.0	244	100.0	67	100.0
First Author	1737	95.9	1411	80.3	201	95.3	106	97.2	218	89.3	65	97.0
No Authorship	75	4.1	346	19.7	10	4.7	3	2.8	26	10.7	2	3.0
TOTAL	1812	100.0	1757	100.0	211	100.0	109	100.0	244	100.0	67	100.0

Item Q: Principal Investigators by Degree

	MD		MD-PhD		PhD	
	N	%	N	%	N	%
PI	2126	59.6	196	61.3	179	57.6
Never PI	1443	40.4	124	38.7	132	42.4
TOTAL	3569	100.0	320	100.0	311	100.0

Item Q: Distribution of Researchers and Non-Researchers by Whether or Not They Became Principal Investigators

	MD				MD-PhD				PhD			
	Rsch		Non-Rsch		Rsch		Non-Rsch		Rsch		Non-Rsch	
	N	%	N	%	N	%	N	%	N	%	N	%
PI	1270	70.1	856	48.7	133	63.0	63	57.8	148	60.7	31	46.3
Never PI	542	29.9	901	51.3	78	37.0	46	42.2	96	39.3	36	53.7
TOTAL	1812	100.0	1757	100.0	211	100.0	109	100.0	244	100.0	67	100.0

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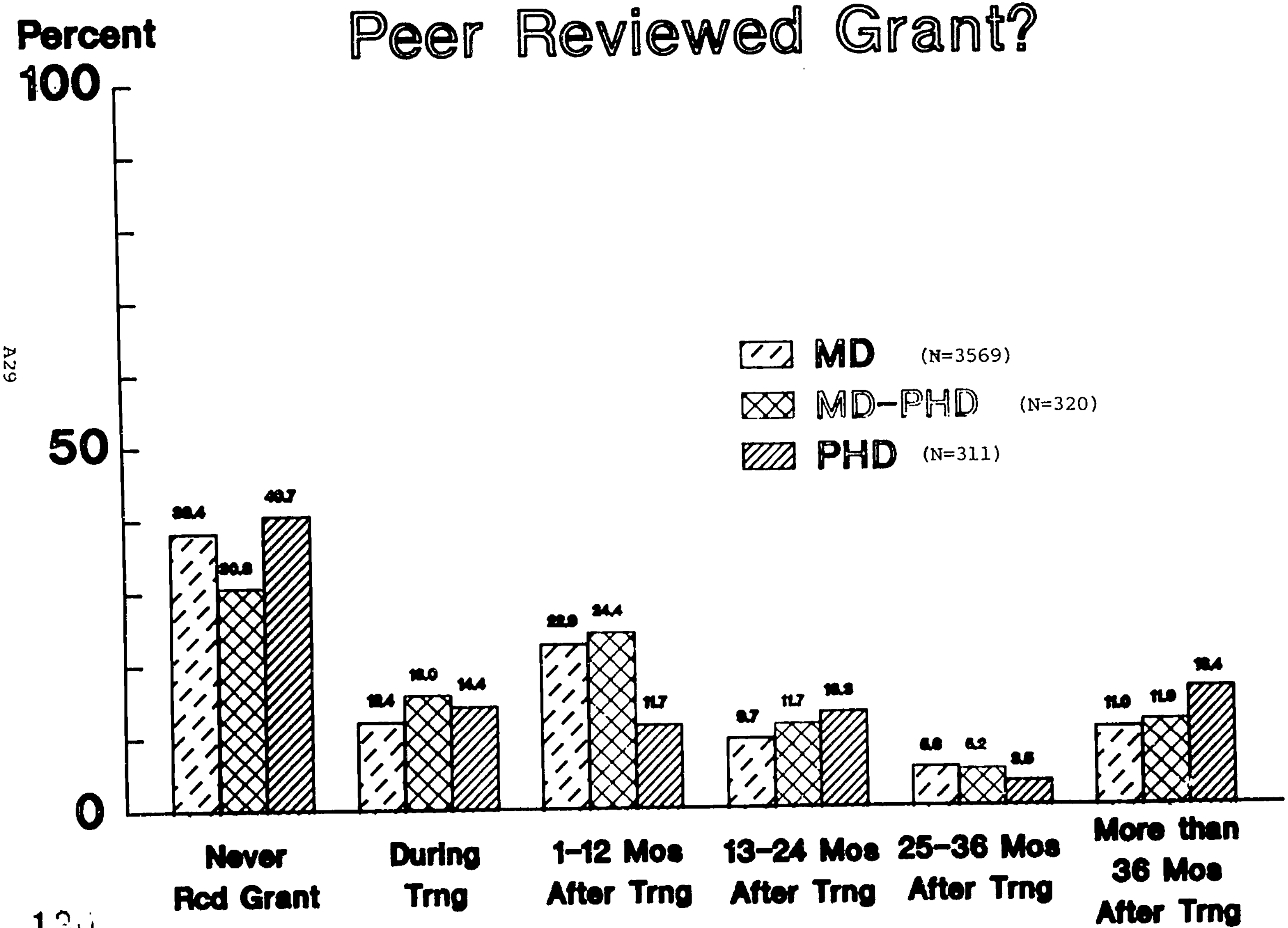
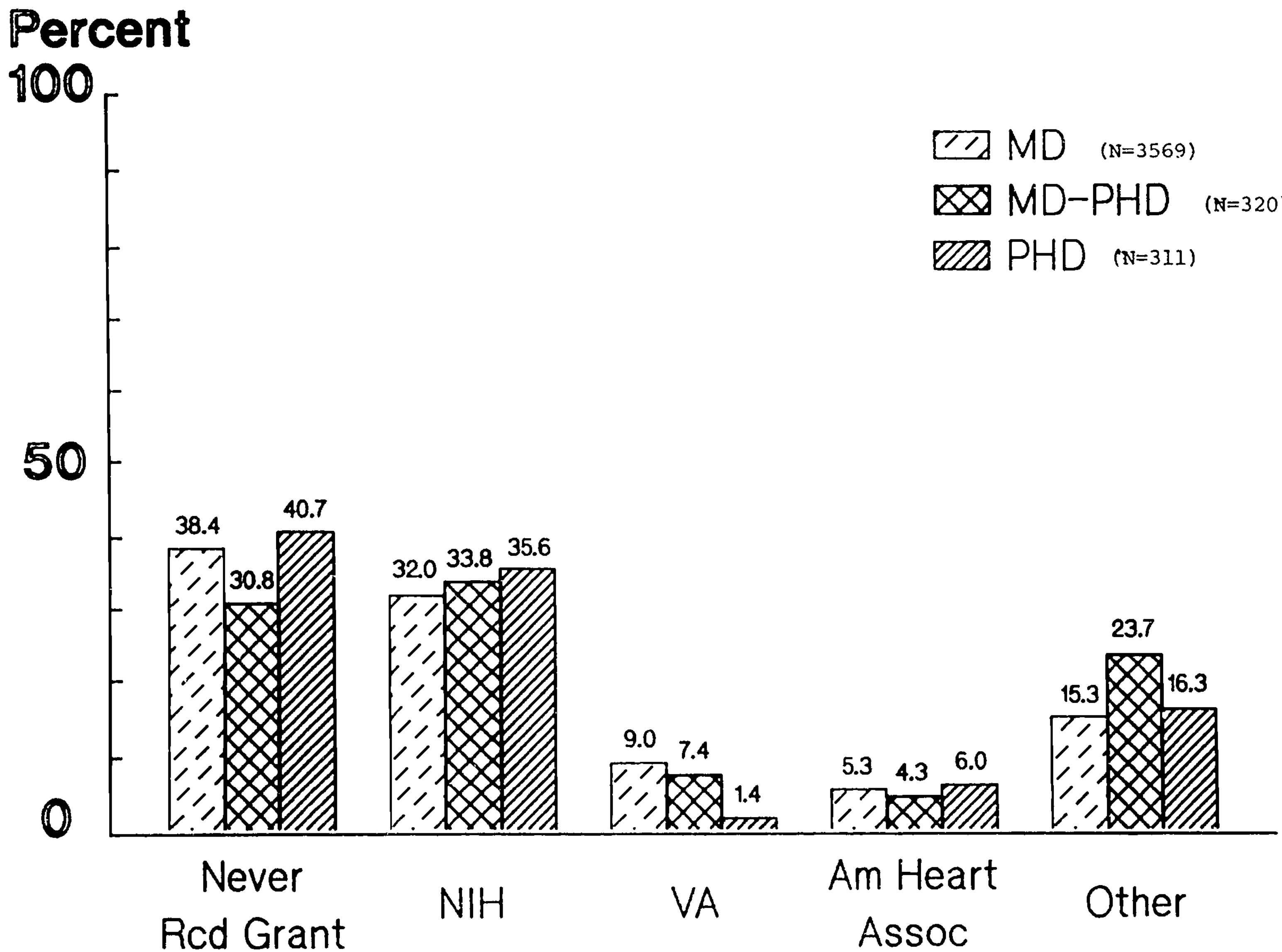
When did you receive your first Peer Reviewed Grant?

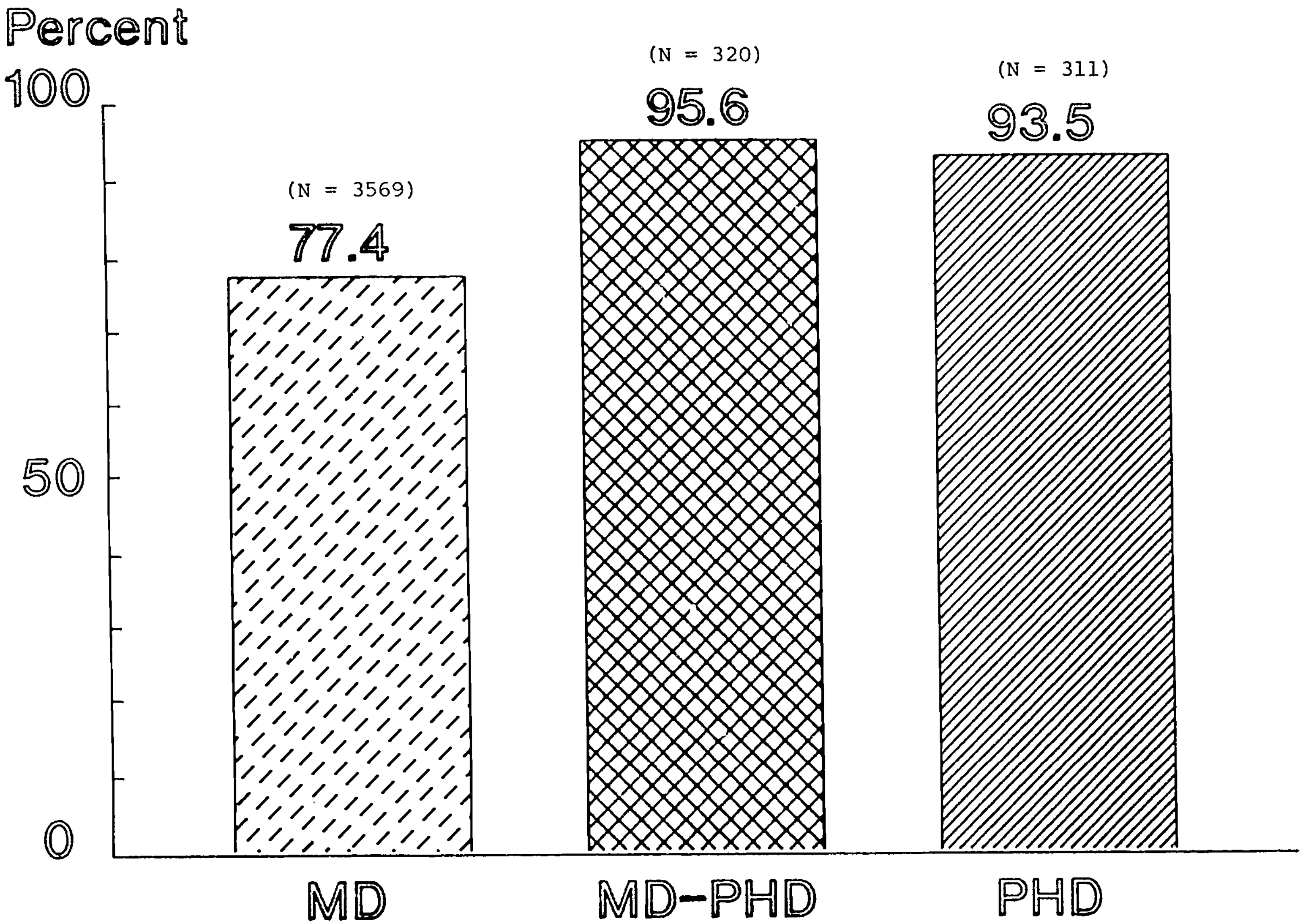


What was the Source of Support for your First Peer Reviewed Grant?



ITEM Q2

Do you think your training properly prepared you for Research?



Item R: Distribution of Researchers and Non-Researchers by Whether or Not Training Properly Prepared Them for Research

	MD				MD-PhD				PhD			
	Rsch		Non-Rsch		Rsch		Non-Rsch		Rsch		Non-Rsch	
Paper Preparation	N	%	N	%	N	%	N	%	N	%	N	%
Yes	1500	82.8	1262	71.8	198	93.8	108	99.1	229	93.9	62	92.5
No	312	17.2	495	28.2	13	6.2	1	.9	15	6.1	5	7.5
TOTAL	1812	100.0	1757	100.0	211	100.0	109	100.0	244	100.0	67	100.0

ITEM S

RECOMMENDATIONS FOR IMPROVING RESEARCH TRAINING PROGRAMS

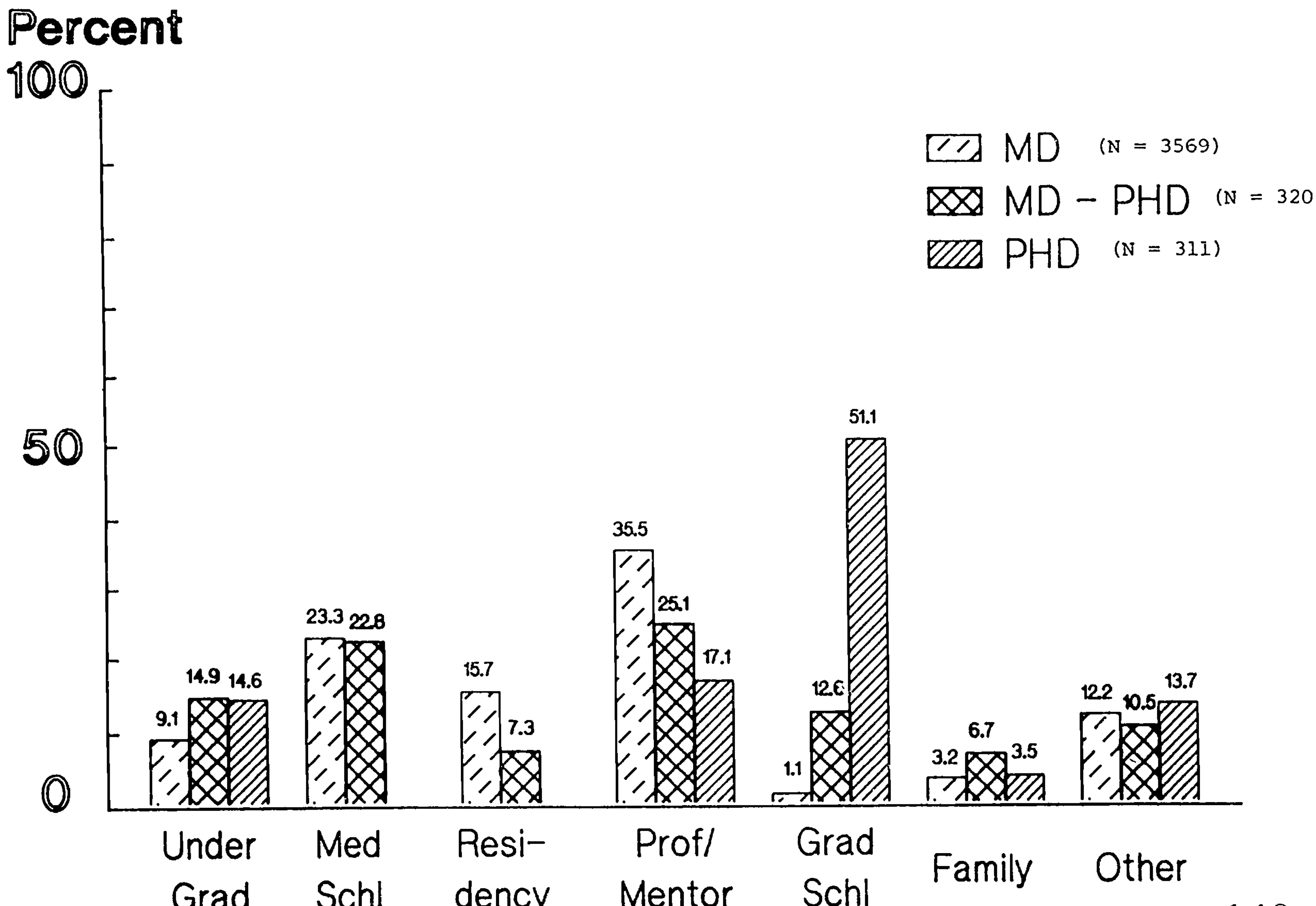
	MD			MD-PhD			PhD		
Recommendations	More	Less	Same	More	Less	Same	More	Less	Same
Length of Training	36.9	2.0	61.0	15.2	9.7	75.1	19.4	7.1	73.5
Math & Stat Courses	67.9	.4	31.7	49.6	-	50.4	54.3	2.5	43.2
Basic Sci Courses	49.0	1.0	50.0	16.6	1.7	81.7	27.4	3.0	69.6
Lab Experience	29.1	2.3	68.6	10.7	1.2	88.1	19.2	2.9	77.9
Time with Mentor	35.7	.8	63.5	36.5	3.5	60.0	29.6	2.5	67.9
Clinical Investigator	21.4	4.8	73.7	22.8	2.4	74.8	19.2	6.8	74.0
Patient Care	15.4	65.3	19.3	10.4	3.1	86.3	6.6	17.2	76.2
Spec. Rsh Tech	58.2	.7	41.1	50.8	.8	48.4	51.8	2.1	46.1
Data Proc/Comp Sci	74.7	.3	25.0	64.1	1.3	34.6	67.5	1.4	31.0
Administration	43.2	4.3	52.4	58.1	2.4	39.5	44.6	8.2	47.2
Med/Tech Writing	37.5	1.5	61.0	44.4	1.2	54.3	34.8	1.9	63.3
Humane Trt of Animals	12.6	3.4	83.9	11.9	2.3	85.8	11.2	6.0	82.8

Item S: Percent Distribution of Researchers and Non-Researchers by Recommendations for Improving Research Training Programs

	MD						MD-PhD					
	Rsch			Non-Rsch			Rsch			Non-Rsch		
Recommendations	More	Less	Same	More	Less	Same	More	Less	Same	More	Less	Same
Length of Training	39.4	1.7	58.8	23.9	1.9	55.1	18.6	6.6	74.9	21.0	8.0	71.0
Math and Stat	67.1	.3	32.6	73.6	.3	26.1	48.7	-	51.3	52.9	-	47.1
Basic Sci Courses	51.3	1.0	47.7	48.9	1.3	49.8	24.6	1.7	73.7	32.6	5.3	62.1
Lab Experience	28.4	1.9	69.7	34.3	2.5	63.2	18.4	2.3	79.3	20.6	4.1	75.3
Time with Mentor	36.9	.8	62.3	34.6	7.0	58.4	31.0	2.2	66.8	27.3	3.0	69.7
Clinical Investigation	17.1	5.6	77.3	27.5	4.7	67.8	21.4	6.8	72.8	15.3	6.1	66.4
Patient Care	1.8	17.4	80.8	4.5	19.5	76.0	8.8	20.1	71.7	3.5	11.8	84.7
Spec. Rsch Tech	58.1	.6	41.3	62.4	.7	36.9	55.3	2.2	42.5	45.5	2.0	52.5
Data Proc/Comp Sci	73.2	.2	26.6	79.1	.6	20.3	63.7	1.8	34.5	70.7	1.0	28.3
Administration	42.4	3.9	53.7	47.3	4.1	48.6	47.1	6.3	46.6	39.8	11.8	48.4
Med/Tech Writing	33.3	1.8	64.9	43.8	1.3	54.8	36.0	.6	63.4	32.6	2.2	63.2
Humane Trt of Animals	11.0	2.9	86.1	14.6	3.6	81.8	11.2	6.9	81.9	11.1	4.5	84.4

	PhD					
	Rsch			Non-Rsch		
Recommendations	More	Less	Same	More	Less	Same
Length of Training	13.2	11.3	75.5	22.6	3.8	73.6
Math and Stat	53.1	1.7	45.2	56.4	4.0	39.6
Basic Sci Courses	16.5	3.6	81.9	17.0	2.1	80.9
Lab Experience	10.4	1.6	88.0	11.5	-	88.5
Time with Mentor	35.8	2.5	61.7	38.9	7.4	53.7
Clinical Investigation	20.8	3.0	76.2	21.6	48.6	27.7
Patient Care	11.4	3.8	84.8	5.9	-	94.1
Spec. Rsch Tech	49.7	.6	49.7	54.4	1.8	43.9
Data Proc/Comp Sci	60.3	5.5	33.2	66.7	-	33.3
Administration	57.0	3.0	40.0	62.3	-	37.7
Med/Tech Writing	44.5	1.0	54.5	44.2	2.0	53.8
Humane Trt of Animals	11.9	2.8	85.3	12.2	-	87.8

What influenced you the most to obtain Research Training?



ITEM U: Degrees Held

Degree	Had Research Training		No Research Training	
	N	%	N	%
MD Only	3569	84.7	1186	85.4
MD-PhD	320	7.6	32	2.3
PhD Only	311	7.4	115	8.3
Other	16	.4	55	4.0
TOTAL	4216	100.0	1388	100.0

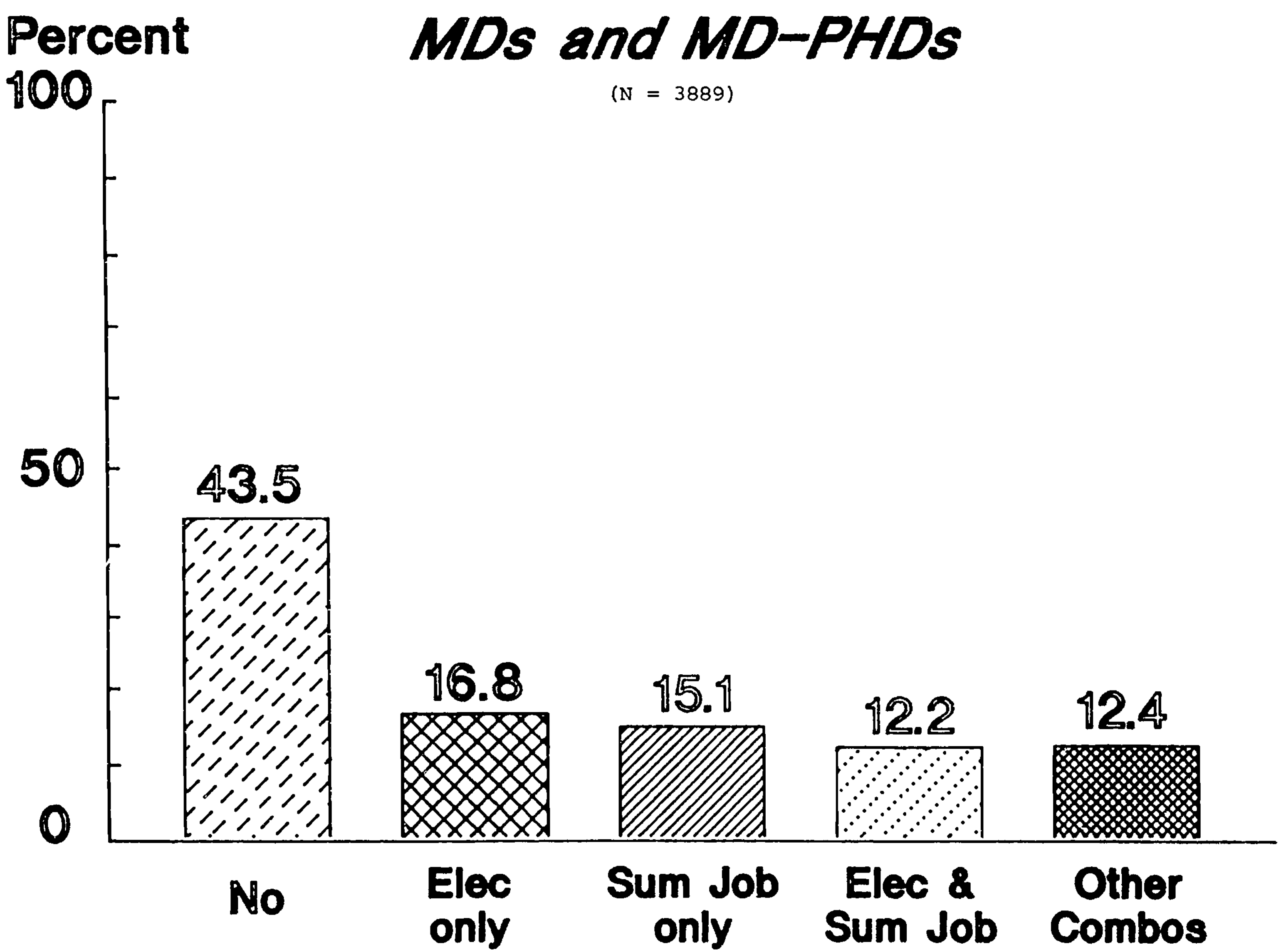
ITEM U: Distribution of Researchers and Non-Researchers by Degree

	Researchers		Non-Researchers	
	N	%	N	%
MD Only	1992	77.9	2763	90.7
MD-PhD	225	8.8	127	4.2
PhD Only	309	12.1	117	3.8
Other	30	1.2	41	1.4
TOTAL	2556	100.0	3048	100.0

While in Medical School did you have any supervised Research Experience?

MDs and MD-PHDs

(N = 3889)



Item U: Researchers and Non-Researchers by Supervised Research Experience in Medical School -- MDs and MD-PhDs

	Researchers		Non-Researchers	
Supervised Experience	N	%	N	%
None	790	39.1	900	48.2
Elective Only	347	17.2	308	16.5
Summer Job Only	311	15.4	276	14.8
Elective & Summer Job	307	15.2	166	8.9
Other Combinations	268	13.2	216	11.6
TOTAL	2023	100.0	1866	100.0

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ITEMS V and W: CURRENT WORK INVOLVES LABORATORY AND CLINICAL RESEARCH

	MD		MD-PhD		PhD	
	#	%	#	%	#	%
Lab Rsch Only	1863	52.2	200	62.5	110	35.4
Clin Rsch Only	265	7.4	41	12.8	177	56.9
Lab & Clin Rsch	1019	28.6	33	10.3	5	1.6
Neither	188	5.3	9	2.8	3	1.0
Missing	234	6.6	37	11.6	16	5.1
TOTAL	3569	100.0	320	100.0	311	100.0

Items V and W: Distribution of Researchers and Non Researchers by Current Work and Degree

Current Work	MD				MD-PhD				PhD			
	Rsch		Non Rsch		Rsch		Non Rsch		Rsch		Non Rsch	
	N	%	N	%	N	%	N	%	N	%	N	%
Lab R*ch Only	1235	68.2	628	35.7	149	70.6	51	46.8	87	35.7	23	34.3
Clin Rsch Only	189	10.4	76	4.3	27	12.8	14	12.8	140	57.4	37	55.2
Lab & Clin Rsch	264	14.6	755	43.0	9	4.3	24	22.0	3	1.2	2	3.0
Neither	8	.4	180	10.2	1	.5	8	7.3	1	.4	2	3.0
Missing	116	6.4	118	6.7	25	11.8	12	11.0	13	5.3	3	4.5
TOTAL	1812	100.0	1757	100.0	211	100.0	109	100.0	244	100.0	67	100.0

FULL-TIME FACULTY RESEARCH ACTIVITY FORM

NAME ______________________ MEDICAL SCHOOL ______________________

SOCIAL SECURITY NUMBER ______________

INSTRUCTIONS

The scope of this survey is limited to the **Career Development and Research Activity of full-time faculty members** in the Department of Internal Medicine. Research Activity is defined as "AN ACTIVITY PERFORMED WITH THE OBJECTIVE OF DEVELOPING KNOWLEDGE WHICH USUALLY LEADS TO PUBLICATION AND WHICH MAY BE THE BASIS FOR FUNDING SUPPORT." Research may be in the Basic, Clinical, or Behavioral Sciences.

A. Have you had one or more Sabbatical(s)? _____ Yes _____ No

B. If yes, please provide the year and duration of each Sabbatical leave.

YEAR	DURATION (months)

C. If you have *not* performed research **as a full-time faculty member** please check here (   ), and return this form to your Department Chairman.

RESEARCH EFFORT AND FUNDING

Please indicate your research effort and sources of funding for the years below.

	YEARS	*FACULTY APPOINTMENT YES/NO	% OF EFFORT IN RES.	**INST./DEPT. FUNDING YES/NO	EXTERNAL FUNDING YES/NO	SOURCE(S) OF FUNDING — ENTER NUMBER CODES FROM LIST BELOW: FOR WHICH YOU WERE PRINCIPAL INVESTIGATOR	FOR WHICH YOU WERE NOT PRINCIPAL INVESTIGATOR
D.	THIS YEAR 1982-83						
E.	2 YEARS AGO 1980-81						
F.	5 YEARS AGO 1977-78						
G.	10 YEARS AGO 1972-73						

Sources of External Funding

1. National Institutes of Health
2. Alcohol, Drug Abuse, and Mental Health Administration (NIMH, NIDA, NIAAA)
3. Other agencies of the Department of Health and Human Services
4. Veterans Administration
5. National Science Foundation
6. Other Federal
7. Foundations, private
8. American Cancer Society
9. American Heart Association
10. Pharmaceutical Company
11. Other Industry, Business
12. Other

*The response should be "NO" for periods when you were a Fellow, Ph.D. candidate or a participant in an M.D./Ph.D. program.

**Specifically designated for research, e.g. General Research Grant.

Please Complete Other Side

RESEARCH TRAINING

H. Check the period of time spent in post-doctoral research training.

1. _______ None
2. _______ Less than 6 months
3. _______ 6 months or more, but less than 1 year
4. _______ 1 year or more, but less than 2 years
5. _______ 2 years or more

I. Indicate year in which formal research training was completed (exclude research training in a Sabbatical year) _______

RESEARCH SPACE

J. Excluding office space, do you currentl; have research space assigned to you?

_____ YES _____ NO

Please estimate the amount of research space (excluding office space) assigned to you.

K. Shared with others ________________ square feet.

L. Exclusively assigned to you ____________ square feet.

M. Does your current research utilize facilities in ar NIH-funded Clinical Research Center?

_____ YES _____ NO

PUBLICATIONS

Please indicate the form in which you communicated the results of your Research during the past **two academic years (July 1981 — June 1983)**. Include those which have been accepted for publication or presented.

	Number as First Author	Number as Co-Author
N. Book Chapters	_______	_______
O. Books	_______	_______
P. Case Reports	_______	_______
Q. Original Articles	_______	_______
R. Review Articles	_______	_______
S. Papers Presented at Scientific Meetings	_______	_______

SURVEY OF POST-DOCTORAL RESEARCH TRAINING INTERNAL MEDICINE FACULTY

DEFINITION OF POST-DOCTORAL RESEARCH TRAINING (For the purpose of this Survey)

An experience devoted to training in the concepts and techniques of experimental science, under the direction of an experienced research Mentor, undertaken after completion of the M.D. and/or Ph.D. degree.

As described above, have you had post-doctoral research training?

1.______yes 2.______no

(If No, please proceed directly to page 6, Section VI.)

INSTRUCTIONS

The survey contains 6 sections: program location and funding, structure, elements, impact, opinion and background. As a faculty member you may have had more than one research training experience, however, the survey is limited to reporting on only two such experiences. If you have had more than one research training program, please select and report on **only two** of the programs that you consider to be most important in your research training.

I. RESEARCH TRAINING PROGRAM - Location and Funding	**RESEARCH TRAINING #1**	**RESEARCH TRAINING #2** *(if applicable)*
A. Type of Institution—**check one:**		
1. Medical School, including teaching hospital	1.______	1.______
2. VA Hospital	2.______	2.______
3. University (other than a medical school)	3.______	3.______
4. Pharmaceutical Company	4.______	4.______
5. National Institutes of Health	5.______	5.______
6. Other Federal Laboratory	6.______	6.______
7. Independent Laboratory	7.______	7.______
8. Foreign Institution	8.______	8.______
9. Other, specify	9.______	9.______
B. Name of Institution (please print)	________	________

	RESEARCH TRAINING #1	RESEARCH TRAINING #2 (if applicable)
C. Name and department of Mentor during the program(s). (Please print.)	______ Last Name ______ First Name ______ Department	______ Last Name ______ First Name ______ Department
D. List inclusively the beginning and ending dates of the training program(s).	___/___ to ___/___ month/year month/year	___/___ to ___/___ month/year month/year
E. What was the duration of your formal research training program(s)? (**Exclude time** spent in **clinical** portion.)	______ months	______ months
F. What was the principal or only source of support for your research training program(s)? **Check only one:**		
1. NIH	1.______	1.______
2. Pharmaceutical Company	2.______	2.______
3. VA Hospital	3.______	3.______
4. Other Hospital	4.______	4.______
5. American Heart Association	5.______	5.______
6. American Cancer Society	6.______	6.______
7. Other	7.______	7.______
8. Unknown	8.______	8.______
G. Did you find it necessary to supplement this income?	1.____yes 2.____no	1.____yes 2.____no
If yes, how did you supplement?		
1. patient care	1.______	1.______
2. other type of work	2.______	2.______
3. personal savings or loan	3.______	3.______
4. spouse/family	4.______	4.______

II. RESEARCH TRAINING PROGRAM - Structure

H. How often did you review data and experimental design with your Supervisor or Mentor during the training experience(s)?	#1 First Year	#1 Second Year	#1 Third Year	#2 First Year	#2 Second Year	#2 Third Year
1. Several times a day	1.____	____	____	1.____	____	____
2. Daily	2.____	____	____	2.____	____	____
3. Weekly	3.____	____	____	3.____	____	____
4. Less often than weekly	4.____	____	____	4.____	____	____

Continued

	RESEARCH TRAINING #1	RESEARCH TRAINING #2 (if applicable)
I. How was your time allocated during the program(s)? (Allocate time by percent effort.)	Percent Effort	Percent Effort
1. Patient Care-research related	1.________	1.________
2. Patient Care-non-research related	2.________	2.________
3. Formal Coursework-required	3.________	3.________
4. Formal Coursework-not required	4.________	4.________
5. Teaching	5.________	5.________
6. Laboratory Experience	6.________	6.________
7. Data Analysis/Data Processing	7.________	7.________
8. Literature Review	8.________	8.________
	Total 100%	Total 100%

III. RESEARCH TRAINING PROGRAM – Elements

Patient Care

	RESEARCH TRAINING #1	RESEARCH TRAINING #2
J. Did you utilize a Clinical Research Center?	1.___NIH sponsored 2.___VA sponsored 3.___Other 4.___No	1.___NIH sponsored 2.___VA sponsored 3.___Other 4.___No
Laboratory Experience		
K. Did you have an area in the laboratory assigned to you for your work?	1.____yes 2.____no	1.____yes 2.____no
If yes, approximately how many square feet were assigned?	________ square feet	________ square feet
L. Did your laboratory work involve animals?	1.____yes 2.____no	1.____yes 2.____no
M. Were you instructed in the humane practice of animal maintenance and research methods?	1.____yes 2.____no	1.____yes 2.____no
If yes, by whom?	1.___Mentor 2.___Veterinarian 3.___Other	1.___Mentor 2.___Veterinarian 3.___Other
Please approximate the time spent in this instruction.	________ hour(s)	________ hour(s)

Continued

Formal Coursework	**RESEARCH TRAINING #1**	**RESEARCH TRAINING #2** *(if applicable)*
N. Did you receive formal coursework during the program(s) in any of the following?		
1. Math and Statistics	1.____yes 2.____no	1.____yes 2.____no
2. Physical Sciences	1.____yes 2.____no	1.____yes 2.____no
3. Medical and Technical Writing	1.____yes 2.____no	1.____yes 2.____no
4. Basic Medical Sciences	1.____yes 2.____no	1.____yes 2.____no
5. Data Processing/Computer Science	1.____yes 2.____no	1.____yes 2.____no
IV. POST RESEARCH TRAINING PROGRAM – Impact		
O. Did the work accomplished during the training program(s) result in your presenting a paper and/or poster at a National meeting?	1.____yes 2.____no	1.____yes 2.____no
P. Did the work accomplished during the training program(s) result in your being first author on an original article?	1.____yes 2.____no	1.____yes 2.____no
Q. Were you ever a Principal Investigator on a peer-reviewed grant?	1.____yes 2.____no	1.____yes 2.____no
If yes, 1). When did you receive your first peer-reviewed grant?	1.____during training 2.____months after training	1.____during training 2.____months after training
2). What was the source of your first peer-reviewed grant on which you were a Principal Investigator? **Check only one:**		
1. NIH	1.____________	1.____________
2. Veterans Administration	2.____________	2.____________
3. American Heart Association	3.____________	3.____________
4. American Cancer Society	4.____________	4.____________
5. National Science Foundation	5.____________	5.____________
6. ADAMHA	6.____________	6.____________
7. Other, please specify	7.____________ ____________	7.____________ ____________

Continued

V. RETROSPECTIVE QUESTIONS

	RESEARCH TRAINING #1	RESEARCH TRAINING #2 *(if applicable)*
R. Do you think your training experience(s) properly prepared you for independent research?	1._____yes 2._____no	1._____yes 2._____no
S. What recommendations would you suggest to improve your research training program(s)?	More / Less / Same	More / Less / Same
1. Length of Training Period	1 ____ ____ ____	1 ____ ____ ____
2. Math and Statistical Coursework	2 ____ ____ ____	2 ____ ____ ____
3. Basic Science Coursework	3 ____ ____ ____	3 ____ ____ ____
4. Laboratory Experience	4 ____ ____ ____	4 ____ ____ ____
5. Time with Mentor	5 ____ ____ ____	5 ____ ____ ____
6. Clinical Investigation	6 ____ ____ ____	6 ____ ____ ____
7. Patient Care	7 ____ ____ ____	7 ____ ____ ____
8. Specific Research Techniques	8 ____ ____ ____	8 ____ ____ ____
9. Data Processing/Computer Science	9 ____ ____ ____	9 ____ ____ ____
10. Administration/Including Grants	10.____ ____ ____	10.____ ____ ____
11. Medical and Technical Writing	11.____ ____ ____	11.____ ____ ____
12. Humane Handling of Animals	12.____ ____ ____	12.____ ____ ____

T. What influenced you *the most* to obtain research training?
If more than one significant influence, rank numerically in order of impact.

______ Undergraduate Experience

______ Medical School Experience

______ Residency

______ Outstanding Professor/Mentor

______ Graduate School

______ Familial Influence

______ Other, please specify______________________________

Continued

VI. BACKGROUND DATA

U. Which of the following degrees do you hold?

1.______________M.D. 2.______________M.D./Ph.D. 3.______________Ph.D. 4.______________Other

If you hold an M.D. degree, while in medical school, did you have any supervised research experience?

1.________yes 2.________no

If yes, check as appropriate

1.______ Elective

2.______ Regular Curriculum

3.______ Summer Job

4.______ Other

V. Does your **current** work include laboratory research?

1.________yes 2.________no

W. Does your **current** work include clinical research?

1.________yes 2.________no

Comments

____

____

____

PLEASE RETURN THIS SURVEY TO YOUR DEPARTMENT CHAIRPERSON BY JUNE 30, 1985

AAMC FORM FR-1
Rev. 8-85

association of american medical colleges

FACULTY ROSTER

A UNIQUE MEDICAL SCHOOL ROSTER CONTINUOUSLY UPDATED AND MAINTAINED FOR SALARIED FULL-TIME FACULTY PROVIDING NATIONAL HEALTH MANPOWER DATA TO MEDICAL SCHOOLS AND FEDERAL AGENCIES

CONSENT FOR RELEASE OF INFORMATION

Please provide signature consent/non-consent to release your record for medical school/federal agencies recruitment purposes.

Yes Consent ______________________________

No Non-Consent ______________________________

For purpose other than recruitment, and for faculty who do not elect to release their data, the following policy is in effect:

DATA RELEASE POLICY

Items designated Ⓒ, Confidential, will be released only to the individual faculty member and to an authorized representative of school. Items designated Ⓡ, Restricted, will be furnished to authorized individuals at member schools and others at the discretion of the AAMC President. Unrestricted Ⓤ, items are considered directory information. Aggregates of any class of data items may be published.

Please read the enclosed instructions and complete the form for entry into the AAMC Faculty Roster System

A50

AAMC FORM FR-1
(Rev 8 85)

AAMC FACULTY ROSTER

FULL-TIME SALARIED FACULTY

1. Current Date: Ⓤ ____/____/____ Month Day Year

2. Medical School Reporting: Ⓤ ____________________

3. Optional Information: Ⓒ (For school use only) [| | | | | | | | | | | | | | | |]

A. BACKGROUND INFORMATION

4. Name of Faculty Member: Ⓤ

4a. Last ____________________ (Indicate if Jr., III, etc.)

4b. First ____________________

4c. Middle ____________________

5. Social Security Number: Ⓒ ____/____/____

6. Sex:(Check one): Ⓡ ______Male ______Female

7. Date of Birth: Ⓡ ____/____/____ Month Day Year

8. Current Citizenship: Ⓤ (Country): ______. ____________________

9. Ethnic/Racial Self-Identification: Ⓡ *(Check only one)*

1____American Indian or Alaskan native
2____Asian or Pacific Islander
3____Black, not of Hispanic origin
4____Mexican American or Chicano (Hispanic)
5____Puerto Rican (Hispanic)
6____Other Hispanic
7____White, not of Hispanic origin
0____Do not wish to respond

B. CURRENT APPOINTMENT INFORMATION

10–11. MEDICAL SCHOOL DEPARTMENT AFFILIATION:Ⓤ

10. Primary Appointment:
Enter None in this Section if your Primary Appointment is in the Parent Institution, not in the Medical School.
☐ None Proceed to Item 11.

10a. Medical School Department:
(Or Administrative Unit Equal to or above Dept. Level)

____

10b. Are You the Chairperson of This Dept.? ☐Yes ☐No

10c. Academic Rank (in Primary Department):

____________________ (Enter exact wording of academic rank)

10d. Equivalent Academic Rank: (Indicate the closest equivalent rank to the rank entered in Item 10c.)

Check only one

____Professor ____Instructor
____Associate Professor ____Other
____Assistant Professor ____None/Not Applicable

11. Joint Appointment in Medical School:
IF NO JOINT APPOINTMENT is held in a Medical School Department check here ☐ and go to Item 12.

11a. Medical School Department: (Or Administrative Unit Equal to or above Dept. Level)

____

11b. Are You the Chairperson of This Dept.? ☐Yes ☐No

11c. Academic Rank (in Joint Department):

____________________ (Enter exact wording of academic rank)

11d. Equivalent Academic Rank: (Indicate the closest equivalent rank to the one entered in Item 11c.)

Check only one

____Professor ____Instructor
____Associate Professor ____Other
____Assistant Professor ____None/Not Applicable

OTHER INFORMATION:

12. Employment Location if Other Than the Medical School or Parent Institution: Ⓤ

____________________ Affiliated Hospital or Other Affiliated Clinical Facility

____________________ Location (City/State)

13. Beginning Date of Your Faculty Appointment at This Medical School While Salaried on a Part or Full-Time Basis by the Medical School, Parent Institution, Affiliated Hospital or Other Affiliated Clinical Facility: Ⓒ

____/____ Month Year

14. Major Areas of Responsibility: Ⓒ
Check usual activities in which you spend at least 10% of your time annually. If a Primary responsibility exists, enter "P" in that category (only one box for "P").

☐ Teaching/Instruction
☐ Research
☐ Patient Care (Patient Education)
☐ Administration
☐ Other Professional Activities

15. U.S. Medical School Rank History: Ⓤ
(Salaried Faculty Appointments Only)

	Date First Achieved Month	Year
a. Professor		
b. Associate Professor		
c. Assistant Professor		
d. Instructor		

SUPPLEMENT
TO
AAMC FACULTY ROSTER FORM

This supplement was prepared to assist new medical school faculty in completing the standard items of information on the FR-1. The information is collected by AAMC on all full-time salaried faculty at U.S. medical schools. The information you supply will be entered into a computer-based data system that has been in operation for over a decade. This system is the basis for national manpower studies, ad hoc statistical data requested by medical schools, and faculty listings utilized by the individual schools for administrative purposes.

Consent for Release of Information

A component of the Faculty Roster is a Recruitment Index of faculty who have provided signed consent to release of their records for recruitment purposes. This Index is not in published format, but is computer-based and accessed only by the Faculty Roster staff upon receipt of a written request by a member of a Search Committee or other official of a medical school. The Index is open to all faculty; however, the primary purpose of this service is to facilitate the access of women and minority faculty members' records for recruitment for positions at other medical schools or their affiliated institutions. Please indicate on the Release of Information section whether or not you wish to have your record included in the Index (see page 1 of the Faculty Roster form).

Data Release Policy

For purposes other than recruitment, and for faculty who do not elect to release their data, the AAMC Data Release Policy is in effect. The Faculty Roster is not available for commercial use. (See page 1 of the Faculty Roster form.)

INSTRUCTIONS

(Limited to those items requiring further information)

Item #

3. Faculty member should leave this item blank. The Optional Information is for administrative use by your medical school.

5. The Social Security Number is the unique identifier for the data base. This insures that the Roster does not contain duplicate faculty records. It is a confidential item, released only to your medical school or with your consent.

9. Ethnic Self-Identification is extracted from the Federal Circular A-46, May 12, 1977:

   1. American Indian or Alaskan Native. Origin in any of the original peoples of North America; maintains cultural identification through tribal affiliation or community recognition.

   2. Asian or Pacific Islander. Origin in the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. Includes China, India, Japan, Korea, the Philippine Islands, and Samoa.

   3. Black. Origin in any of the black racial groups of Africa.

   4-6. Hispanic. Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race (the Faculty Roster maintains three selections for Hispanic peoples).

   7. White. Origin in any of the original peoples of Europe, North Africa, or the Middle East.

10. For faculty who have their primary faculty appointment in the school of medicine or an affiliated hospital (e.g., the V.A. hospital) or in an affiliated clinical facility (laboratories, centers, or other institutions), please complete item 10. However, if your primary appointment is in another school of the parent institution (School of Nursing, School of Dentistry, etc.), do not complete this section. Check the box marked "None" and proceed to Item 11.

11. Joint appointments can be held by those faculty who:

   a) hold an official appointment in a second medical school department in addition to their primary appointment;

   b) hold an appointment in a medical school department in addition to their primary appointment in another school of the parent institution (School of Nursing, School of Pharmacy, etc.).

12. Are you physically working at a location other than the School of Medicine or another school of the parent institution? If so, provide the name of the affiliated hospital or other clinical facility.

13. This item does not refer to your contract date of reappointment. The date represents the beginning date of your service and exclusive of periods of volunteer faculty appointments. If you have had a break in salaried faculty status at this school, the date you returned to salaried faculty status should be used for this item.

14. The purpose of this item is to determine the aggregate number of faculty whose primary responsibility is teaching, or research, or one of the other areas given. A "P" in a specific box will indicate a primary responsibility, while a check will indicate other duties performed. The boxes checked should reflect your judgment of the areas in which you spend at least 10% of your time on an annual basis.

15. Provide the month and year in which you received the rank of Instructor, and subsequent ranks, if applicable, while holding a salaried faculty appointment at a U.S. medical school.

16. The year of your first full- or part-time salaried faculty appointment at any U.S. medical school. This includes medical school faculty appointments held while salaried on a full- or part-time basis at the parent institution, an affiliated hospital, or other affiliated clinical facilities.

17. The year when you first received a full-time salaried faculty appointment at any U.S. medical school. This includes medical school faculty appointments held while salaried on a full-time basis at the parent institution, an affiliated hospital, or other affiliated clinical facilities.

18-23. This item refers only to previous professional employment. It does not refer to training or education experience.

1. If you previously held a faculty appointment at a U.S. institution, provide the school name and state, and complete items a-e.
2. If your medical school faculty appointment was concurrent with U.S. hospital employment, provide the name, city and state of the hospital and complete items a-e.
3. For all other types of employment, select from the list provided.

25-28A. For faculty members receiving their advanced degrees in U.S. institutions, this section is self-explanatory. Please note that information for a Masters degree is requested only for those with a Masters of Public Health; complete information on other Masters degree only if that degree is the highest degree you hold.

29. This question refers to post-doctoral research training. Reply in the affirmative only if the training was for at least 6 months.

M.D.'s and D.O.'s ONLY:

30. Please check this box if you have had no graduate medical education in the United States.

31-35. List by year Residency training and clinical fellowships.

36-39. Select your medical specialty from the list contained on the last page of these instructions. Provide the year of your first Board Certification (do not furnish the year of re-certification), if applicable.

DEFINITIONS

1. "Affiliated hospital/clinical facility/institution" -- Any hospital/clinical facility/institution in which a faculty member carries out teaching or research duties.

2. "Parent Institution" -- The unit in administrative control of all colleges at that university system.

DEGREE LIST

MEDICAL	
D O	Doctor - Osteopathy
MB BS	Bachelor of Medicine & Surgery
M D	Doctor - Medicine

DOCTORAL	(Ph.D. or equivalent)
D D	Doctor - Divinity
D ED	Doctor - Education
D E	Doctor - Engineering
D EE	Doctor - Electrical Engineering
D JUR SC	Doctor - Juridical Science
LL D	Doctor - Law
D LIT	Doctor - Literature
D M SC	Doctor - Medical Science
PH D	Doctor - Philosophy
D SC	Doctor - Science
D SW	Doctor - Social Work

DOCTORAL	(Other Health Professional)
D C	Doctor - Chiropractic
D M D	Doctor - Dental Medicine
D D S	Doctor - Dental Surgery
O D	Doctor - Optometry
D PHARM	Doctor - Pharmacy
POD D	Doctor - Podiatry
D PH	Doctor - Public Health
D V M	Doctor - Veterinary Medicine

FIELD OF STUDY

ADMINISTRATION
- Administration, general
- Education Administration
- Hospital Administration
  - *including* Health Administration
- Public Administration
- Research Administration
- Administration, all other (Specify)

ALLIED HEALTH, NOT ELSEWHERE CLASSIFIED (Specify)

ANATOMY
- Anatomy, general
- Comparative Anatomy
- Developmental Biology
- Embryology, Developmental Anatomy
- Gross Anatomy
- Histology, Microanatomy
- Neuroanatomy
- Anatomy, all other (Specify)

ANESTHESIOLOGY

ANTHROPOLOGY

AUDIOLOGY AND SPEECH PATHOLOGY

BEHAVIORAL SCIENCES, NOT ELSEWHERE CLASSIFIED (Specify)

BIOCHEMISTRY
- Biochemistry, general
- Biophysical Chemistry
- Cell Biology, Cytology
- Cyto-histochemistry
- Cytology, biochemistry
- Intermediary Metabolism
- Metabolic Errors and Diseases
- Metabolism, other
- Medicinal Chemistry, *including* Pharmaceutical Chemistry
- Microbiological Chemistry
- Molecular Biology
- Neurochemistry
- Protein Biochemistry
- Biochemistry, all other (Specify)

BIOLOGICAL SCIENCES (General)

BIOLOGICAL SCIENCES, NOT ELSEWHERE CLASSIFIED (Specify)

BIOLOGY (General)

BIOPHYSICS

BOTANY
- Botany, general
- Plant Pathology
- Plant Physiology
- Botany, all other (Specify)

CHEMISTRY
- Chemistry, general
- Inorganic Chemistry
- Organic Chemistry
- Physical Chemistry
- Chemistry, all other (Specify)

CHEMOTHERAPY

COMMUNITY HEALTH SERVICES

DENTISTRY
- Dentistry, general
- Oral Pathology
- Oral Surgery
- Dentistry, all other (Specify)

DERMATOLOGY

DIETETICS

ECOLOGY

ECONOMICS

EMBRYOLOGY

EMERGENCY MEDICINE

ENDOCRINOLOGY

ENGINEERING
- Engineering, general
- Bioengineering
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Mechanical Engineering
- Sanitary Engineering
- Engineering, all other (Specify)

ENTOMOLOGY

ENVIRONMENTAL HEALTH SCIENCES

FAMILY PRACTICE
- (General medicine, Primary care)

FOOD SCIENCES AND TECHNOLOGY

GENETICS
- Genetics, general
- Behavioral Genetics
- Biochemical Genetics
- Cytogenetics
- Developmental Genetics
- Immunogenetics
- Microbial Genetics
- Population Genetics
- Radiation Genetics
- Genetics, all other (Specify)

GERIATRICS (GERONTOLOGY)

HISTORY OF MEDICINE

IMMUNOLOGY
- Immunology, general
  - *including* Serology
- Hypersensitivity, Allergy, Allergic Reactions
- Immunochemistry
- Immunopathology, *including* Auto-immunity and Blood Group Incompatibility
- Transplantation Immunology
- Immunology, all other (Specify)

INFORMATION AND COMPUTER SCIENCE
- Information and Computer Science
- Biomedical Communications

INTERNAL MEDICINE
- Internal Medicine, general
- Allergy
- Allergy and Immunology
- Cardiology
- Endocrinology and Metabolism
- Gastroenterology
- Hematology
- Immunology
- Infectious Disease
- Medical Oncology
- Nephrology (Renal Disease)
- Nuclear Medicine (Medicine)
- Pulmonary Disease
- Rheumatology
- Internal Medicine, all other (Specify)

LIBRARY SCIENCE

MATHEMATICS
- Mathematics, general
- Biometry
- Biostatistics (Statistics, Public Health Statistics)
- Biomathematics
- Mathematics, all other (Non-biologically related, specify)

MEDICAL LIBRARIAN

MEDICAL RECORDS LIBRARIAN

MEDICAL ILLUSTRATION

MEDICAL SPECIALTIES, NOT ELSEWHERE CLASSIFIED (Specify)

MEDICAL TECHNOLOGY

MICROBIOLOGY & PARASITOLOGY
- Microbiology, general
- Parasitology
- Bacteriology
- Mycology
- Protozoology
- Virology
- Microbiology, all other (Specify)

NEUROBIOLOGY

NEUROLOGY
- Neurology
- Child Neurology
- Neurology/Child Neurology

NUCLEAR MEDICINE

NURSING
- Nursing
- Midwifery
- Psychiatric Nursing
- Public Health Nursing
- Nursing, all other (Specify)

NUTRITION

OBSTETRICS AND GYNECOLOGY
- Obstetrics and Gynecology
- Gynecological Oncology
- Gynecology
- Maternal and Fetal Medicine
- Obstetrics
- Reproductive Endocrinology

OCCUPATIONAL THERAPY

ONCOLOGY

OPTOMETRY

OSTEOPATHY

PATHOLOGY (BASIC)
- Pathology, general
- Comparative Pathology
- Experimental Pathology
- Microscopic Pathology
- Oncology, pathology
- Radiation Pathology
- Pathology (Basic), all other (Specify)

PATHOLOGY (CLINICAL)
- Anatomic, Clinical & Forensic Pathology
- Anatomic Pathology
- Anatomic and Clinical Pathology
- Anatomic and Forensic Pathology
- Anatomic Pathology and Medical Microbiology
- Anatomic Pathology and Neuropathology
- Blood Banking
- Chemical Pathology
- Clinical Pathology
- Clinical Pathology/Hematology
- Dermatopathology
- Forensic Pathology
- Hematology
- Immunopathology
- Medical Microbiology
- Medical Microbiology and Medical Chemistry
- Neuropathology
- Nuclear Medicine (Pathology)
- Radioisotopic Pathology
- Pathology (Clinical), all other (Specify)

PEDIATRICS
- Pediatrics, general
- Allergy, pediatric
- Allergy & Immunology, pediatric
- Cardiology, pediatric
- Endocrinology, pediatric
- Hematology/Oncology, pediatric
- Neonatal-perinatal Medicine
- Nephrology, pediatric
- Surgery, pediatric (Pediatrics)
- Pediatrics, all other (Specify)

PHARMACOLOGY
- Pharmacology, general
- Chemotherapy & Experimental Therapeutics
- Clinical Pharmacology
- Neuropharmacology
- Psychopharmacology
- Toxicology
- Pharmacology, all other (Specify)

PHARMACY

PHYSICAL MEDICINE & REHABILITATION

PHYSICAL SCIENCES, NOT ELSEWHERE CLASSIFIED (Specify)

PHYSICAL THERAPY

PHYSICS
- Physics, general
- Health Physics
- Nuclear Physics
- Physics, all other (Specify)

FIELD OF STUDY (continued)

PHYSIOLOGY
- Physiology, general
- Cardiovascular Physiology
- Gastrointestinal Physiology
- Muscle Physiology
- Neurophysiology
- Physiological Chemistry
- Pulmonary and Respiratory Physiology
- Renal Physiology
- Reproductive Physiology
- Physiology, all other (Specify)

PODIATRY (CHIROPODY)

POLITICAL SCIENCE

PSYCHIATRY
- Psychiatry, general
- Psychiatry and Neurology
- Child Psychiatry
- Psychoanalysis
- Psychiatry, all other (Specify)

PSYCHOLOGY
- Psychology, general
- Child Psychology
- Clinical Psychology
- Counseling and Guidance
- Developmental Psychology
- Educational Psychology
- Experimental, Comparative & Physiological Psychology
- Industrial & Personnel Psychology
- Personality
- Psychology, all other (Specify)

PUBLIC HEALTH AND PREVENTIVE MEDICINE
- General Preventive Medicine
- Aerospace Medicine
- Community Medicine
- Epidemiology
- Maternal and Child Health
- Occupational Medicine
- Public Health
- Public Health, all other (Specify)

RADIOLOGIC TECHNOLOGY

RADIOLOGY
- Radiology, general
- Diagnostic Radiology
- Diagnostic Radiology/Nuclear Radiology
- Medical Nuclear Physics
- Neuroradiology
- Nuclear Medicine (Radiology)
- Radiological Physics
- Radium Therapy
- Roentgen Ray & Gamma Ray Physics
- Therapeutic Radiology
- Therapeutic Radiological Physics
- Therapeutic & Diagnostic Radiological Physics
- Radiology, all other (Specify)

SOCIAL SCIENCES, NOT ELSEWHERE CLASSIFIED (Specify)

SOCIAL WORK INCLUDING WELFARE SERVICES
- Social Work, general
- Medical Social Work
- Psychiatric Social Work
- Social Work, all other (Specify)

SOCIOLOGY

SPECIAL EDUCATION

SURGERY
- Surgery, general
- Colon and Rectal Surgery
- Critical Care Medicine
- General Vascular Surgery
- Neurological Surgery
- Ophthalmology
- Orthopedic Surger
- Otolaryngology
- Pediatric Surgery (Surgery)
- Plastic Surgery
- Thoracic Surgery
- Urology
- Surgery, all other (Specify)

VETERINARY MEDICINE
- Veterinary Medicine
- Laboratory Animal Medicine

VOCATIONAL COUNSELING

ZOOLOGY

ZOOLOGY-ENTOMOLOGY

OTHER
Includes Business, Education, History, Law, Philosophy, Religion, Etc.

RESIDENCY PROGRAMS

- Aerospace Medicine
- Allergy & Immunology (Med.)
- Allergy & Immunology (Ped.)
- Anesthesiology
- Blood Banking
- Child Psychiatry
- Colon & Rectal Surgery
- Dermatology
- Dermatopathology
- Diagnostic Radiology
- Diagnostic Radiology/ Nuclear Radiology
- Emergency Medicine
- Family Practice
- Flexible
- Forensic Pathology
- General Practice
- Internal Medicine
- Neurological Surgery
- Neurology
- Neuropathology
- Nuclear Medicine
- Obstetrics and Gynecology
- Occupational Medicine
- Ophthalmology
- Orthopedic Surgery
- Otolaryngology
- Pathology
- Pediatric Allergy
- Pediatric Cardiology
- Pediatric Surgery
- Pediatrics
- Physical Medicine & Rehabilitation
- Plastic Surgery
- Preventive Medicine
- Psychiatry
- Public Health
- Radiology
- Surgery
- Therapeutic Radiology
- Thoracic Surgery
- Transitional
- Urology

MEDICAL SPECIALTY (OR SUB-SPECIALTY) AND BOARD CERTIFICATION

- Allergy and Immunology
- Anesthesiology
- Colon and Rectal Surgery
- Dermatology
- Emergency Medicine
- Family Practice

Medicine, Internal
- Allergy
- Allergy & Immunology (Medicine)
- Cardiovascular Disease
- Endocrinology & Metabolism
- Gastroenterology
- Hematology
- Infectious Disease
- Medical Oncology
- Nephrology
- Nuclear Medicine (Medicine)
- Pulmonary Disease
- Rheumatology

- Neurological Surgery
- Nuclear Medicine

Obstetrics & Gynecology
- Gynecology
- Gynecological Oncology
- Maternal & Fetal Medicine
- Obstetrics
- Reproductive Endocrinology

- Ophthalmology
- Orthopedic Surgery
- Otolaryngology

*Pathology
- Anatomic, Clinical & Forensic Pathology
- Anatomic Pathology
- Anatomic & Clinical Pathology
- Anatomic & Forensic Pathology
- Anatomic Pathology & Med. Microbiology
- Anatomic Pathology & Neuropathology
- Blood Banking
- Chemical Pathology
- Clinical Pathology
- Clinical Pathology/Hematology
- Dermatopathology
- Forensic Pathology
- Hematology
- Immunopathology
- Medical Microbiology

*Use only sub-specialty for Board Certification entry.

*Pathology (continued)
- Med. Microbiology & Med. Chemistry
- Neuropathology
- Nuclear Medicine (Pathology)
- Radioisotopic Pathology

Pediatrics
- Allergy & Immunology (Pediatrics)
- Neonatal-perinatal Medicine
- Pediatric Allergy
- Pediatric Cardiology
- Pediatric Endocrinology
- Pediatric Hematology-Oncology
- Pediatric Nephrology
- Pediatric Surgery (Pediatrics)

- Physical Medicine & Rehabilitation
- Plastic Surgery

*Preventive Medicine
- Aerospace Medicine
- General Preventive Medicine
- Occupational Medicine
- Public Health

Psychiatry & Neurology
- Child Neurology
- Child Psychiatry
- Neurology
- Neurology/Child Neurology
- Psychiatry
- Psychoanalysis

Radiology
- Diagnostic Radiology
- Diagnostic Radiology/Nuclear Medicine
- Medical Nuclear Physics
- Neuroradiology
- Nuclear Medicine (Radiology)
- Radiological Physics
- Radium Therapy
- Roentgen Ray & Gamma Ray Physics
- Therapeutic Radiology
- Therapeutic Radiological Physics
- Therapeutic & Diagnostic Radiological Physics

Surgery
- Critical Care Medicine
- General Vascular Surgery
- Pediatric Surgery (Surgery)

- Thoracic Surgery
- Urology

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C. PROFESSIONAL EMPLOYMENT HISTORY Ⓤ

16. Year of First Salaried (full or part-time) Faculty Appointment at a U.S. Medical School: ________
17. Year of First Full-Time Salaried Faculty Appointment at a U.S. Medical School: ________

For Both Responses, Include Faculty Appointments Held While Salaried by an Affiliated Institution.

18–23 **Previous Professional Employment:**

(List most recent employment first.)

FOR MEDICAL SCHOOL FACULTY APPOINTMENTS ONLY: columns (f) and (g)

	Years: From (a)	Years: To (b)	TYPE OF EMPLOYMENT 1) For U.S. Academic Employment, enter school name and state. 2) If U.S. Hospital enter name, city and state. 3) For all Other Employment, select from list below. (c)	NATURE OF SALARIED EMPLOYMENT Full or Part time (d)	MAJOR ACTIVITIES (Check the activities engaged in on an annual basis for at least 10% of your time) (Check as applicable) (e): Teaching	Research	Patient Care	Admin.	Other	MEDICAL SCHOOL DEPARTMENT (f)	HIGHEST ACADEMIC RANK HELD Indicate closest equivalent: Professor Associate Professor Assistant Professor Instructor Other None/Not Applicable (g)
18.											
19.											
20.											
21.											
22.											
23.											

PROFESSIONAL EMPLOYMENT LIST

- U.S. Government - PHS (NIH, NIMH)
- U.S. Government - Veterans Administration
- U.S. Government - Dept. of Defense
- U.S. Government - Other
- U.S. Active Military Service
- State or Local Government
- Private Business or Industry
- Private Practice of Medicine (MD's & DO's only)
- Foundation, Research Institute, Association (or other non-profit organization)
- Foreign Employment
- Other Employment (Specify) ________

D. EDUCATION AND TRAINING Ⓤ

24. **If You Have No Earned Advanced Degrees, Please Check** ☐

25. - 28. **Earned Advanced Degrees** (If two degrees at the same level are held, enter the more recent.)

	ADVANCED DEGREE	SPECIFY DEGREE (a)	FIELD OF STUDY (See Instructions) (b)	STATE (U.S.)	COUNTRY (Foreign)	INSTITUTION CONFERRING DEGREE (U.S. and Canada Only) (c)	YEAR CONFERRED (d)
25.	M.D., D.O., M.B.B.S., or Foreign Equivalent		MEDICINE				
26.	PH.D. or Equivalent						
27.	OTHER DOCTORATE Health-Related						
28.	MASTERS OF PUBLIC HEALTH						
28A.	Other Masters Degree (If this is the highest degree held)						

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D. EDUCATION AND TRAINING Ⓤ – continued

29. Have You Received Post-Doctoral Research Training of at Least Six Months Duration? ☐ Yes ☐ No

E. M.D.'S ONLY (INCLUDING D.O.'S AND FOREIGN EQUIVALENT) COMPLETE THIS SECTION Ⓤ

Graduate Medical Education in the U.S.A. (Include both Residencies and Clinical Fellowships)

30. None ☐

	YEARS		SPECIALTY/SUB-SPECIALTY	U.S. HOSPITAL/OR OTHER INSTITUTION CITY/STATE	(Check if Applicable) Were Training Requirements Completed for Board Certification or for Sub-Specialty Certification? (e)	
	FROM (a)	TO (b)	(c)	(d)	Yes	No
31.						
32.						
33.						
34.						
35.						

36.–39. **Medical Specialty/Sub-Specialty and U.S. Board Certifications:**
Restricted to American Board of Medical Specialties recognized Boards – See Instructions.

	U.S. Board Certified	Year Certified
36. ☐ None		
37a. Primary ______	b. ☐ Yes ☐ No	c. ______
38a. Second ______	b. ☐ Yes ☐ No	c. ______
39a. Third ______	b. ☐ Yes ☐ No	c. ______

Appendix B

ASSESSMENT OF RESPONSE BIAS

The Wave II survey was sent to individuals who had responded to Wave I. The Wave II response was 5,604 or 79.3 percent. Table B-1 shows the overall and school-by-school response rates for both surveys.

When a nonstratified sample or an entire population is surveyed, there are two main ways of checking for possible nonresponse bias: (1) by comparing response rates across categories of individuals in the population for which possible response rate differences would be a cause for concern, and (2) by comparing population and respondent frequency distributions on critical variables. Although response rate comparisons are informative, the comparison of population and respondent frequency distributions is more immediately relevant to the evaluation of possible biases in parameter estimates. The discussion that follows centers primarily around comparative frequency distributions. Comparisons of response rates may be found in the Appendix.

DEMOGRAPHIC CHARACTERISTICS

The sex, age and ethnicity of the respondents were compared to those of the survey population to determine whether any response bias existed in either the Wave I or Wave II data.

Sex

Table B-2 shows the percentage distribution of the population and respondents to Wave I and Wave II by sex. The proportion of males was 0.3 percentage points greater among Wave I respondents, and 1.7 percentage points higher among Wave II respondents, than in the population. The Wave II findings could therefore be subject to a very slight bias toward over-representation of the male segment of the population.

TABLE B-1

APM/AAMC POST-DOCTORAL RESEARCH ACTIVITY & TRAINING SURVEYS
WAVE I/WAVE II RATE OF RESPONSE

		WAVE I						WAVE II				
CODE	SCHOOL	NUMBER SENT	NUMBER ADDED	RETURNED COMPLETE	RETURNED INCOMPLETE	RATE OF RESPONSE	ADJUSTED RATE OF RESPONSE	NUMBER SENT	RETURNED COMPLETE	RETURNED INCOMPLETE	RATE OF RESPONSE	ADJUSTED RATE OF RESPONSE
	TOTAL/ALL SCHOOLS	9940	2174	7947	821	72.4	70.4	7947	5604	881	81.6	79.3
10100	UNIV. ALABAMA	71	42	97	5	90.3	89.8	98*	75	9	85.7	84.3
10200	ALBANY	73	16	55	4	66.3	64.7	54*	38	3	75.9	74.5
10300	UNIV. ARKANSAS	45	37	50	25	91.5	87.7	50	38	8	92.0	90.5
10400	BAYLOR	187	13	142	18	80.0	78.0	143*	104	32	95.1	93.7
10500	BOSTON UNIV.	75	21	60	13	76.0	72.3	60	44	6	83.3	81.5
10600	BOWMAN GRAY	71	3	54	2	75.7	75.0	54	40	7	87.0	85.1
10700	SUNY-BUFFALO	41	37	65	5	89.7	89.0	65	46	13	90.8	88.5
10800	UC-SAN FRANCISCO	102	-	76	12	86.3	84.4	76	67	4	93.4	93.1
10900	UCLA	320	59	286	22	81.3	80.1	284*	215	27	85.2	83.7
11000	CHICAGO MED.	41	2	27	4	72.1	69.2	27	10	17	100.0	100.0
11100	UNIV. CHICAGO	74	9	61	3	77.1	76.3	63*	46	8	85.7	83.7
11200	UNIV. CINCINNATI	105	3	90	4	87.0	86.5	90	56	12	75.6	71.8
11300	UNIV. COLORADO	80	15	68	8	80.0	78.2	66*	32	3	53.0	50.8
11400	COLUMBIA UNIV.	136	4	115	5	85.7	85.2	115	83	7	78.3	76.9
11500	CORNELL	61	151	173	15	88.7	87.8	173	116	3	68.8	68.2
11600	CREIGHTON	37	2	31	-	79.5	79.5	32*	20	1	65.6	64.5
11700	UNIV. FLORIDA	77	2	64	1	82.3	82.1	64	52	4	87.5	86.7
11800	DARTMOUTH	70	14	57	3	71.4	70.4	57	24	3	47.4	44.4
11900	DUKE	133	15	118	8	85.1	84.3	116*	95	8	88.8	88.0
12000	EINSTEIN	183	61	131	19	61.5	58.2	131	82	20	77.9	73.9
12100	EMORY	115	-	89	-	77.4	77.4	89	63	10	82.0	80.0
12200	GEORGETOWN	84	7	42	8	54.9	50.6	42	26	5	73.8	70.3
12300	GEO. WASHINGTON UNIV.	82	36	74	33	90.7	87.1	74	39	14	71.6	65.0
12400	MED. COLL. GEORGIA	83	9	66	6	78.3	76.7	66	44	9	80.3	77.2
12500	HAHNEMANN	73	29	51	-	50.0	50.0	52*	27	17	84.6	77.1

*Number differs from Wave I response due to transfers from other institutions.

**"Special Status" Schools: Responded to original WAVE I survey at time of WAVE II survey distribution.

"Returned incomplete" = deactivations, sabbaticals

Rate of response = (completed forms + incomplete forms)/(number sent + adds)

Adjusted rate of response = (completed forms)/(number sent + adds - incomplete forms)

TABLE B-1 (continued)

APM WAVE I/WAVE II RATE OF RESPONSE, page 2

		WAVE I						WAVE II				
CODE	SCHOOL	NUMBER SENT	NUMBER ADDED	RETURNED COMPLETE	RETURNED INCOMPLETE	RATE OF RESPONSE	ADJUSTED RATE OF RESPONSE	NUMBER SENT	RETURNED COMPLETE	RETURNED INCOMPLETE	RATE OF RESPONSE	ADJUSTED RATE OF RESPONSE
12600	HARVARD**	562	11	181	48	40.0	34.5	181	175	6	100.0	100.0
12700	HOWARD	29	5	21	-	61.8	61.8	21	9	1	47.6	45.0
12800	UNIV. ILLINOIS	20	45	51	11	95.4	94.4	52*	35	10	86.5	83.3
12900	INDIANA UNIV.	125	-	108	1	87.2	87.1	109*	68	7	68.8	66.7
13000	UC-IRVINE	66	-	38	1	59.1	58.5	38	29	1	79.0	78.4
13100	UNIV. IOWA	104	7	83	8	82.0	80.6	79*	61	16	97.5	93.6
13200	JEFFERSON MED.	26	20	40	-	87.0	87.0	40	30	5	87.5	85.7
13300	JOHNS HOPKINS	210	50	137	27	63.1	58.8	136*	70	9	58.1	55.1
13400	UNIV. KANSAS	68	5	56	-	76.7	76.7	56	46	5	91.1	90.2
13500	UNIV. KENTUCKY	56	11	39	7	68.7	65.0	38*	16	4	52.6	47.1
13600	SUNY-DOWNSTATE	40	23	40	6	73.0	70.2	40	29	4	82.5	80.6
13700	LSU-NEW ORLEANS	58	34	49	4	57.6	55.7	49	35	5	81.6	79.6
13800	UNIV. LOUISVILLE	40	11	36	3	76.5	75.0	37*	28	6	91.9	90.3
13900	LOYOLA	60	17	65	3	88.3	87.8	65	40	1	63.1	62.5
14000	UNIV. MIAMI	99	48	99	5	70.8	69.7	99	80	10	90.9	89.9
14100	M.C. WISCONSIN**	100	-	58	14	72.0	67.4	59*	58	-	98.3	98.3
14200	UNIV. MARYLAND	44	25	66	-	95.7	95.7	67*	46	21	100.0	100.0
14300	LOMA LINDA	107	3	75	-	68.2	68.2	79	59	6	86.7	85.5
14400	MEHARRY	9	11	13	1	70.0	68.4	13	9	2	84.6	81.8
14500	UNIV. MICHIGAN	135	8	94	16	76.9	74.0	90*	66	14	88.9	86.8
14600	UNIV. MINN-MPLS	171	16	110	34	77.0	71.9	112*	90	17	95.5	94.7
14700	UNIV. MISSISSIPPI	32	13	23	-	51.1	51.1	23	16	4	87.0	84.2
14800	MISSOURI-COLUMBIA	49	7	38	10	85.7	82.6	36*	22	9	86.1	81.5
14900	UNIV. NEBRASKA	59	-	42	9	86.4	84.0	43*	34	5	90.7	89.5
15000	UNIV. NEW MEXICO	54	1	41	2	78.2	77.4	42*	31	7	90.5	88.6
15100	NEW YORK MED. COLL.	48	65	79	20	87.6	85.0	80*	18	9	32.5	25.0
15200	NEW YORK UNIV.	93	24	99	1	85.5	85.3	99	89	9	99.0	98.9
15300	UNIV. NO. CAROLINA	108	-	96	1	89.8	89.7	93*	68	7	80.7	79.1
15400	UNIV. NO. DAKOTA	6	3	8	1	100.0	100.0	8	7	1	100.0	100.0
15500	NORTHWESTERN	13	52	60	1	93.9	93.8	60	51	1	86.7	86.4
15600	OHIO STATE	59	-	52	-	88.1	88.1	52	38	5	80.8	79.2
15700	UNIV. OKLAHOMA	72	14	65	-	75.6	75.6	65	50	7	87.7	86.2
15800	UNIV. OREGON	37	29	49	6	83.3	81.7	48*	37	2	81.3	80.4
15900	UNIV. PENNSYLVANIA	160	-	122	1	76.9	76.7	122	59	4	51.6	50.0
16000	UNIV. TX-SAN ANTONIO	93	12	71	9	76.2	74.0	72*	62	10	100.0	100.0

TABLE B-1 (continued)

APM WAVE I/WAVE II RATE OF RESPONSE, page 3

CODE	SCHOOL	WAVE I NUMBER SENT	WAVE I NUMBER ADDED	WAVE I RETURNED COMPLETE	WAVE I RETURNED INCOMPLETE	WAVE I RATE OF RESPONSE	WAVE I ADJUSTED RATE OF RESPONSE	WAVE II NUMBER SENT	WAVE II RETURNED COMPLETE	WAVE II RETURNED INCOMPLETE	WAVE II RATE OF RESPONSE	WAVE II ADJUSTED RATE OF RESPONSE
16100	UNIV. PUERTO RICO	59	25	51	3	64.3	63.0	52*	29	5	64.5	61.7
16200	UNIV. PITTSBURGH	120	6	116	2	93.7	93.6	116	98	18	100.0	100.0
16300	UNIV. ROCHESTER	146	9	133	6	89.7	89.3	133	65	14	59.4	54.6
16400	ST. LOUIS	101	19	82	7	74.2	72.6	83*	55	18	88.0	84.6
16500	M.U. SO. CAROLINA	71	8	49	7	70.9	68.1	49	41	8	100.0	100.0
16600	UNIV. SO. DAKOTA	10	2	10	2	100.0	100.0	10	9	1	100.0	100.0
16700	UNIV. SO. CALIFORNIA	132	-	73	2	56.8	56.2	73	56	6	84.9	83.6
16800	UNIV. TX-DALLAS	94	-	86	-	91.5	91.5	86	60	12	83.7	81.1
16900	STANFORD	68	16	57	12	82.1	79.2	57	40	7	82.5	80.0
17000	NJ-NEWARK	48	16	46	5	79.7	78.0	46	33	13	100.0	100.0
17100	SUNY-UPSTATE	34	-	27	3	88.2	87.1	27	22	5	100.0	100.0
17200	TEMPLE UNIV.	91	6	56	4	61.9	60.2	56	49	6	98.2	98.0
17300	UNIV. TENNESSEE	76	29	51	39	85.7	77.3	51	27	4	60.8	57.5
17400	UNIV. TX-GALVESTON	57	1	41	-	70.7	70.7	41	30	3	80.5	79.0
17500	TUFTS	215	352	112	31	25.2	20.9	112	65	23	78.6	73.0
17600	TULANE	53	6	40	2	71.2	70.2	40	23	7	75.0	69.7
17700	UNIV. UTAH	108	11	83	6	74.8	73.5	86*	67	6	84.9	83.4
17800	VANDERBILT	102	6	79	6	78.7	77.5	81*	52	15	82.7	78.8
17900	UNIV. VERMONT	56	2	47	-	81.0	81.0	50*	42	4	92.0	91.3
18000	RUTGERS	38	26	39	1	62.5	61.9	40*	28	3	77.5	75.7
18100	UNIV. VIRGINIA	90	1	60	-	65.9	65.9	59*	48	5	89.8	88.9
18200	MED. COLL. VIRGINIA	112	6	79	7	72.9	71.2	79	35	15	63.3	54.7
18300	UNIV. WASHINGTON	266	-	198	4	75.9	75.6	201*	143	18	80.1	78.1
18400	WASHINGTON UNIV.**	138	6	112	18	90.3	88.9	112	97	15	100.0	100.0
18500	WAYNE STATE	63	4	44	5	73.1	71.0	43*	34	4	88.4	87.2
18600	CASE WESTERN	248	9	182	33	83.7	81.3	182	83	18	55.5	50.6
18700	WEST VA. UNIV.	43	5	41	-	85.4	85.4	39*	32	2	87.2	86.5
18800	UNIV. WISCONSIN	73	17	67	8	83.3	81.7	67	56	7	94.0	93.3
18900	MED. COLL. PENNSYLVANIA	19	8	20	1	77.8	76.9	20	19	1	100.0	100.0
19000	UNIV. CONNECTICUT	63	45	78	11	82.4	80.4	76*	38	9	61.8	56.7
19100	YALE	100	8	85	3	81.5	81.0	83*	64	7	85.5	84.2
19200	BROWN	72	13	46	-	54.1	54.1	47*	34	7	87.2	85.0
19300	ARIZONA	81	7	46	2	54.5	53.5	46	28	6	73.9	70.0
19400	UC-SAN DIEGO	111	8	95	5	84.0	83.3	95	73	12	89.5	88.0
19500	UNIV. MASSACHUSETTS	52	14	52	-	78.8	78.7	51*	40	4	86.3	85.1

TABLE B-1 (continued)

APM WAVE I/WAVE II RATE OF RESPONSE, page 4

CODE	SCHOOL	WAVE I NUMBER SENT	WAVE I NUMBER ADDED	WAVE I RETURNED COMPLETE	WAVE I RETURNED INCOMPLETE	WAVE I RATE OF RESPONSE	WAVE I ADJUSTED RATE OF RESPONSE	WAVE II NUMBER SENT	WAVE II RETURNED COMPLETE	WAVE II RETURNED INCOMPETE	WAVE II RATE OF RESPONSE	WAVE II ADJUSTED RATE OF RESPONSE
19600	MICHIGAN STATE	13	17	25	3	93.3	92.6	25	19	6	100.0	100.0
19700	UNIV. HAWAII	8	51	8	-	13.6	13.6	8	8	-	100.0	100.0
19800	PENN STATE	47	-	38	1	83.0	82.6	37*	25	6	83.8	80.7
80100	MT. SINAI	165	14	106	8	63.7	62.0	106	73	3	71.7	70.9
80200	UC-DAVIS	58	3	52	-	85.2	85.2	52	42	9	98.1	97.7
80300	MED. COLL. OHIO	35	4	29	4	84.6	82.9	29	21	6	93.1	91.3
80400	LSU-SHREVEPORT	11	16	21	3	88.9	87.5	21	15	4	90.5	88.2
80500	SUNY-STONY BROOK	118	-	58	5	53.4	51.3	59*	50	2	88.1	87.2
80600	UNIV. SO. FLORIDA	47	15	52	3	88.7	88.1	53*	48	5	100.0	100.0
80700	UNIV. NEVADA	14	1	13	-	86.7	86.7	13	5	4	69.2	55.5
80800	MISSOURI-KANSAS CITY	38	12	27	1	56.0	55.1	26*	18	6	92.3	90.0
80900	UNIV. TX-HOUSTON	43	29	41	25	91.7	87.2	41	23	5	68.3	63.9
81000	SO. ILLINOIS	11	25	10	2	33.3	29.4	10	9	1	100.0	100.0
81200	RUSH	59	13	36	2	52.8	51.4	36	14	-	38.9	38.9
81300	EAST CAROLINA UNIV.	1	19	19	-	95.0	95.0	19	16	2	94.7	88.9
81400	TEXAS TECH	24	4	16	5	75.0	69.6	16	6	4	62.5	50.0
81600	UNIV. SO. ALABAMA	15	1	13	2	93.8	92.9	13	12	-	92.3	92.3
81700	MAYO	285	1	257	3	90.9	90.8	256*	232	8	93.8	93.6
81800	EASTERN VIRGINIA**	65	27	22	32	58.7	36.7	22	20	2	100.0	100.0
81900	WRIGHT STATE	9	1	9	-	90.0	90.0	9	3	1	44.4	37.5
82000	UNIV. SO. CAROLINA	11	7	13	3	88.9	86.7	13	8	3	84.6	80.0
82100	UNIFORMED SERVICES	42	16	13	-	22.4	22.4	13	8	4	92.3	88.9
82300	TEXAS A&M	103	2	67	5	68.6	67.0	68*	26	2	41.2	39.4
82400	NORTHEASTERN OHIO	29	25	32	-	59.3	59.3	32	16	3	59.4	55.2
82600	EAST TENNESSEE	19	12	17	1	58.1	56.7	17	14	2	94.1	93.3
82700	ORAL ROBERTS	7	10	11	3	82.4	78.6	11	4	6	90.9	80.0
82800	MARSHALL	20	1	13	2	71.4	68.4	13	11	1	92.3	91.7
82900	PONCE**	2	-	-	-	0.0	0.0	-	-	-	0.0	0.0

Table B-2: Distribution of Respondents by Sex

Sex	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Male	9927	87.9	7010	88.2	5023	89.6
Female	1346	11.9	932	11.7	579	10.3
Missing	20	.2	5	.1	2	.1
Total	11293	100.0	7947	100.0	5604	100.0

Age

The distribution of population and respondents by age groups is shown in Table B-3.

The Wave I respondent age distribution is virtually the same as that of the population. Among the Wave II respondents those between the ages 40 and 59 appear to be very slightly overrepresented.

Table B-3: Distribution of Respondents by Age

Age Group	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Under 30 years	4	.0	2	.0	1	.0
30-39 yrs.	2961	26.2	2098	26.4	1371	24.5
40-49 yrs.	4425	39.2	3162	39.8	2286	40.8
50-59 yrs.	2469	21.9	1758	22.1	1309	23.4
60-69 yrs.	1177	10.4	820	10.3	586	10.5
70 yrs. and older	197	1.7	94	1.2	45	.8
Missing	60	.5	13	.2	6	.1
Total	11293	100.0	7947	100.0	5604	100.0

The largest difference is in the "30-39" age group, which is underrepresented among Wave II respondents by 1.7 percentage points, but again, this difference is too small to introduce any meaningful bias into the overall frequency distributions of outcome variables.

Ethnicity

The Faculty Roster System uses seven categories of ethnic self-description. Table B-4 depicts the respondent distributions across these categories.

Table B-4: Distribution of Respondents by Ethnicity

Ethnic Group	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Am. Indian	6	.1	5	.1	4	.0
Asian	785	7.0	527	6.6	323	5.8
Black	162	1.4	114	1.4	61	1.1
Mexican Am.	19	.2	12	.2	8	.1
Puerto Rican	83	.7	53	.7	32	.6
Other Hispanic	154	1.4	101	1.3	68	1.2
White	9098	80.6	6784	85.4	4895	87.4
Missing	986	8.7	351	4.4	213	3.8
Total	11293	100.0	7947	100.0	5604	100.0

These figures reveal that whites are overrepresented by about 4.8 percentage points among Wave I respondents and by about 6.8 percentage points among Wave II respondents, while most of the minority groups are underrepresented. This kind of pattern is very common in surveys of this type, and is not likely to greatly affect findings because the numbers of minority group members in the population are one to two orders of magnitude smaller than the numbers of whites.

ACADEMIC CHARACTERISTICS

As the respondents are all full-time members of medical school faculties, certain academic characteristics should be analyzed to determine the representativeness of the sample. These characteristics are rank, type of degree, and year of first appointment to a medical school faculty.

Rank

Table B-5 shows the distribution of rank for the population and for survey respondents. The standard AAMC equivalent ranks are used in this table.

Table B-5: Distribution of Respondents by Rank

Rank	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Professor	3012	26.7	2351	29.6	1828	32.6
Assoc. Prof.	2714	24.0	2064	26.0	1529	27.3
Asst. Prof.	4231	37.5	3015	37.9	1961	35.0
Instructor	1105	9.8	412	5.2	248	4.4
Other	147	1.3	58	.7	17	.3
Missing	84	.7	47	.6	21	.4
Total	11293	100.0	7947	100.0	5604	100.0

The percentages of respondents drop by relatively large amounts at the instructor and "other" category levels. Faculty in these rank categories may have tended to self-select for nonresponse because of low research involvement. Even so, the overall distribution shows that the proportions of respondents in these categories probably do not differ enough to introduce a great deal of bias into the findings.

Degree Type

Medical school faculty within departments of internal medicine are fairly evenly distributed by degree type from institution to institution, with MD degrees predominant. Table B-6 shows the distributions for the population and for respondents.

Table B-6: Distribution of Respondents by Degree

Degree	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
MD Only	9367	82.9	6600	83.1	4755	84.9
MD-PhD	717	6.4	547	6.9	352	6.3
PhD Only	904	8.0	646	8.1	426	7.6
Other	244	2.2	118	1.5	65	1.2
Missing	61	.5	36	.5	6	.1
Total	11293	100.0	7947	100.0	5604	100.0

The variations in these distributions reinforce the findings regarding rank in that groups who would probably be less involved in research were also somewhat less likely to respond to the surveys.

Year of First Appointment

The year of first appointment frequency distribution reflects both the expansion of medical school faculty by decade and the career age of respondents. Table B-7 shows the distributions for this variable.

Table B-7: Distribution of Respondents by Year of First Faculty Appointment

Year of First Appt.	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Prior to 1950	191	1.7	118	1.5	79	1.4
1950-1959	820	7.3	618	7.8	448	8.0
1960-1969	2022	17.9	1516	19.1	1134	20.2
1970-1979	5173	45.8	3835	48.3	2766	49.4
1980 & Later	2381	21.1	1734	21.8	1102	19.7
Missing	706	6.3	126	1.6	75	1.3
Total	11293	100.0	7947	100.0	5604	100.0

Again, the distributions are fairly consistent with some differences shown in the lower and higher ends of the spectrum.

RESEARCH CHARACTERISTICS

The final three characteristics to be examined are research-specific and therefore directly address the survey agenda. These characteristics are: (1) the extent of research involvement as reported by faculty to the Faculty Roster, (2) the research intensity of the institution (based on research expenditures), and (3) whether the school is public or private.

Research Responsibility

Faculty members are asked to report to the Roster whether or not research is considered one of their responsibilities. Population and respondent distributions by responses to this question are shown in Table B-8.

Table B-8: Distribution of Respondents by Research Responsibility

Research Responsibility	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Primary	1542	13.7	1257	15.8	900	16.1
Partial	6204	54.9	4751	59.8	3434	61.3
Not at All	3547	31.4	1939	24.4	1270	22.6
Total	11293	100.0	7947	100.0	5604	100.0

It comes as no surprise that respondents who considered research a primary responsibility were more likely to respond to the survey. Faculty claiming no research responsibility are underrepresented by about seven percentage points among Wave I respondents and by about 8.8 percentage points among Wave II respondents. Those reporting that research is their primary responsibility are overrepresented by about 2.1 percentage points among Wave I respondents and by about 2.4 percentage points among Wave II respondents.

Research Intensity

Medical schools are divided into three groups (Top 40, Middle 40, Bottom 47) by the amount of research expenditures of the institution. Table B-9 shows the population and respondent distributions among these three categories. The response rates within research intensity categories are as follows.

Table B-9: Distribution of Respondents by Research Intensity of Institution

Research Intensity	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
High	5730	50.7	4230	53.2	3007	53.7
Middle	3558	31.5	2297	28.9	1660	29.6
Low	2005	17.8	1420	17.9	937	16.7
Total	11293	100.0	7947	100.0	5604	100.0

The difference between the two distributions is most evident in the "middle" group, but the overall distributions are nevertheless very similar from the population through the Wave II respondents.

Public/Private Institutions

Whether an institution is publicly or privately controlled seems to have an effect on the amount of research activity within an institution. Table B-10 shows population and respondent distributions in public and private schools. Since private schools make up a disproportionate number of the most research-intensive schools, these figures reveal a pattern differing slightly from that of the cther distribution comparisons.

Table B-10: Distributions of Respondents by Public/Private Institutions

Institutions	Population		Wave I Respondents		Wave II Respondents	
	N	%	N	%	N	%
Public	5304	47.0	3992	50.2	2857	51.0
Private	5989	53.0	3955	49.8	2747	49.0
Total	11293	100.0	7947	100.0	5604	100.0

SUMMARY AND CONCLUSIONS

The purpose of this report is to ensure that conclusions drawn in the APM/AAMC research activities study are not rendered invalid by response bias. In the planning of this effort, two possible outcomes were envisioned: (1) the data would be weighted to offset response bias, or (2) it would be decided that no weights were needed. Based on the evidence presented here, it is the judgment of the APM and the AAMC that a caveat concerning the probable overrepresentation of faculty members who are heavily involved in research should accompany the study's findings, but that the validity of the findings would not be significantly enhanced by weighting the data to compensate for this suspected overrepresentation.

Appendix

Response Rate Tables

Table B-11

Age Group	Wave I	Wave II
30-39	70.9	65.3
40-49	71.5	72.3
50-59	71.2	74.5
60-69	69.7	71.5
Over 70	47.7	47.9

Table B-12

Category	Wave I	Wave II
American Indian	83.3	80.0
Asian	67.1	61.3
Black	70.4	53.5
Mexican American	63.2	66.7
Puerto Rican	63.9	60.4
Other Hispanic	65.6	67.3
White	74.6	72.2

Table B-13

Rank	Wave I	Wave II
Professor	78.1	77.8
Associate Professor	76.1	74.1
Assistant Professor	71.3	65.0
Instructor	37.3	60.2
Other	39.5	29.3

Table B-14

Degree Type	Wave I	Wave II
MD Only	70.5	72.1
MD-PhD	76.3	64.4
PhD Only	71.5	65.9
Other Degrees	48.4	55.1

Table B-15

Decade of Appt.	Wave I	Wave II
Prior to 1950	61.8	66.9
1950-1959	75.4	72.5
1960-1969	75.0	74.8
1970-1979	74.1	72.1
1980 & Later	72.8	63.6

Table B-16

Research Responsibility	Wave I	Wave II
Primary	81.5	71.6
Partial	76.6	72.3
Not at All	54.7	65.5

Table B-17

Research Intensity	Wave I	Wave II
High	73.8	71.1
Middle	64.6	72.3
Low	70.8	66.0

Appendix C

COMPARISON OF CLINICAL FACULTY TO THOSE WITHOUT CLINICAL RANK DESIGNATIONS

Seventy-six of the 123 participating medical schools use titles such as "professor of clinical medicine" or "clinical professor of medicine" to distinguish faculty whose responsibilities are almost entirely patient service and clinical teaching from full-time faculty with regular academic ranks, who are expected to carry on research and other scholarly activities. The 47 institutions who do not report any clinical titles may not grant full-time faculty status to such individuals at all, or they give them the same titles in spite of reduced expectations. Because of the nature of their appointments, it should be expected that faculty with clinical ranks would be less involved in research than the other faculty. It is of interest, therefore, to examine some of the survey results separately for the two groups. The initial survey population included all full-time faculty, including both clinical and regular ranks from these institutions.

The first four tables compare the demographic characteristics of the clinical faculty to those in the other respondent group.

Table C-1 shows the percentages of faculty with and without clinical titles in the internal medicine population and among those who responded to the survey. There is a sizable difference in response rates--44.7 percent in contrast to 71.6 percent of the regular faculty in schools where clinical titles are used and 75.6 percent in schools where they are not used. Because of the small number of clinical faculty in the population, however, this response rate difference does not greatly affect the respondent distribution. There are at least two possible explanations for the underrepresentation of clinical faculty:

1) Faculty with clinical titles may have self-selected out of the survey because of its research orientation.

2) Faculty with clinical titles are often located away from the medical school so that follow-up is more difficult.

Table C-2 shows the distribution of clinical and non-clinical faculty by sex in the study population and among survey respondents. The distributions of the respondents and the population are similar, although the percentage of females is higher among the faculty with clinical ranks who participated in the study than in the population at large.

The distribution of degrees held by faculty with clinical ranks and regular faculty is depicted in Table C-3. In the population, there is a greater proportion of MD faculty with clinical titles than of PhD faculty with clinical titles. This seems reasonable, as few PhDs would qualify as primarily clinical. Again, the respondent distribution is similar to the population distribution, with the exception that MD faculty with clinical titles participated in the survey in smaller proportions than those who do not have clinical titles.

Table C-4 compares the academic ranks of clinical and non-clinical faculty. There are fewer primarily clinical faculty in the professorial rank and significantly more at the instructor level than in the remainder of the population. This difference is also evident among survey respondents, where associate professors are overrepresented and instructors are underrepresented in the clinical ranks. Again, self-selection out of research-oriented studies may have played a role here.

As described in the body of this report, active researcher has been defined as an individual who devotes at least 20 percent of effort towards research, had authored or co-authored at least one original publication during the two years preceding the survey, and has either external research funding or assigned laboratory space. Using this criterion, the study found that 47.3 percent of the MD and MD-PhD faculty can be considered active researchers. Within this group, 43.3 percent were NIH PIs. Table C-5 shows numbers and percentages of faculty with clinical ranks and other faculty who do and do not meet the criterion for designation as active researchers, and who are and are not NIH PIs. Faculty who meet the criterion for designation as active researchers comprise 26.2 percent of the faculty with clinical ranks and 48.8 percent of the faculty without clinical titles. Similarly, 10.4 percent of the faculty with clinical ranks as compared to 25.4 percent of the regular faculty are NIH PIs.

To summarize, faculty with clinical ranks are slightly underrepresented in the survey, perhaps due to self-selection out of the study. Among respondents, clinical and regular faculty are demographically quite similar. Regular faculty are, however, substantially more likely than their clinical colleagues to meet the study criterion for classification as active researchers and also more likely to be NIH PIs. Because the aggregate number of faculty with clinical ranks is relatively small, statistics for all respondents are not greatly different from statistics for responding faculty with regular academic ranks.

Table C-1

Distribution of Faculty by Clinical and Regular Ranks

Rank Description	Schools Not Using Clinical Titles: Population N	Population %	Respondents N	Respondents %	Rate of Response %	Schools Using Clinical Titles: Population N	Population %	Respondents N	Respondents %	Rate of Response %
Clinical	-	-	-	-	-	1040	13.4	465	8.8	44.7
Regular	3560	100.0	2690	100.0	75.6	6693	86.6	4792	91.2	71.6
TOTAL	3560	100.0	2690	100.0	75.6	7733	100.0	5257	100.0	68.0

Table C-2

Distribution of Clinical and Regular Faculty by Sex

	Schools Not Using Clinical Titles: Population		Respondents		Schools Using Clinical Titles: Population: Clinical		Population: Regular		Respondents: Clinical		Respondents: Regular	
Male	3190	89.6	2416	89.8	896	86.2	5841	87.3	382	82.2	4212	87.9
Female	369	10.4	273	10.1	136	13.1	841	12.6	83	17.8	576	12.0
Missing	1	.1	1	.1	8	.8	11	.2	-	-	4	.1
TOTAL	3560	100.0	2690	100.0	1040	100.0	6693	100.0	465	100.0	4792	100.0

Table C-3

Distribution of Clinical and Regular Faculty by Degree

	Schools Not Using Clinical Titles: Population		Respondents		Schools Using Clinical Titles: Population: Clinical		Population: Regular		Respondents: Clinical		Respondents: Regular	
MD Only	2985	83.8	2239	83.2	944	90.8	5438	81.2	403	86.7	3958	82.6
MD-PhD	240	6.7	201	7.5	33	3.2	444	6.6	21	4.5	325	6.8
PhD Only	256	7.2	198	7.1	40	3.8	608	9.1	27	5.8	421	8.8
Other	49	1.4	35	1.3	23	2.2	172	2.6	14	3.0	69	1.4
Missing	30	.8	17	.6	-	-	31	.5	-	-	19	.4
TOTAL	3560	100.0	2690	100.0	1040	100.0	6693	100.0	465	100.0	4792	100.0

Table C-4

Distribution of Clinical and Regular Faculty by Rank

Rank	Population				Survey Respondents			
	Clinical		Regular		Clinical		Regular	
	N	%	N	%	N	%	N	%
Professor	121	11.6	2891	28.2	64	13.8	2287	30.6
Associate	334	32.1	2380	23.2	219	47.1	1845	24.7
Assistant	337	32.4	3894	38.0	153	32.9	2862	38.3
Instructor	242	23.3	863	8.4	25	5.4	387	5.2
Other	6	.6	141	1.4	4	.9	54	.7
Missing	-	-	84	.8	-	-	47	.6
TOTAL	1040	100.0	10253	100.0	465	100.0	7482	100.0

Table C-5

Distribution of MD and MD-PhD Faculty by Clinical and Regular Ranks and by Research Involvement Indices

Indices of Research Involvement	Clinical		Regular	
	N	%	N	%
Effort, Funds, Space, Pubs	64	15.1	2545	37.9
Effort, Funds, Pubs (No Space)	38	9.0	541	8.1
Effort, Space, Pubs (No Funds)	9	2.1	187	2.8
Effort, Funds, Space (No Pubs)	8	1.9	123	1.8
Funds, Space, Pubs (Low Effort)	7	1.7	370	5.5
Funds, Pubs (No Space, Low Effort)	26	6.1	418	6.2
Pubs Only	46	10.9	394	5.9
Funds Only	23	5.4	325	4.8
Others	203	47.9	1820	27.1
TOTAL	424	100.0	6723	100.0
NIH PI	44	10.4	1709	25.4
Not NIH PI	380	89.6	5014	74.6
TOTAL	424	100.0	6723	100.0

Appendix D

COMPARISON OF
"Research Activity of Full-Time Faculty in Departments of Medicine"
(APM/AAMC, 1986)
TO
"On the Status of Medical School Faculty and Clinical Research Manpower, 1968-1990"
(Sherman et al., 1982)

Introduction

In a report published by the National Institutes of Health (NIH) in 1982, Charles R. Sherman and other members of the Association of American Medical Colleges (AAMC) staff presented extensive data on the research activities of MD medical school faculty surveyed in 1980.[1] From 1983 through 1986 the Association of Professors of Medicine (APM) and the AAMC carried out an NIH-sponsored study of the research training and activities of faculty in departments of internal medicine.[2,3] Some of the data collected for the APM/AAMC study are approximately comparable to data reported earlier by Sherman *et al*. This report compares selected findings of the APM/AAMC study to the findings of Sherman *et al*. regarding faculty in the medical specialties.

These comparisons are presented with the following caveats:

1) Sherman *et al*. used a sample stratified by specialty and age group and the results were statistically weighted to reflect the population; the APM/AAMC study attempted to reach the entire population of internal medicine faculty.

2) Sherman *et al*. combined internal medicine with pediatrics, allergy and neurology in a group labelled "medical specialties." (That study also included four other categories of specialties, none of which are referred to in this comparison.)

3) Sherman *et al*. collected lifetime publication data; the APM/AAMC study asked respondents to provide such information for only a two-year period.

4) The Sherman *et al*. study was limited to regular ranks (no clinical titles).

Comparison of the Samples

Sherman *et al*. selected faculty members with the following characteristics:

- At least an MD degree.
- The rank of assistant, associate or full professor (none with "clinical" or "adjunct" rank titles).
- Received the MD degree between the years 1944 and 1972.

Tables D-1 through D-5 compare the medical specialties segment of the Sherman _et al._ sampling frame (approximately synonymous with population) to APM/AAMC respondents on a series of background variables. The data in these tables are divided into categories by length of time since MD graduation, and the categories parallel the strata used by Sherman _et al._ Table D-1 shows data on the entirety of the APM/AAMC study population and on the medical specialties segment of the Sherman _et al._ study population. Tables D-2 through D-5 include only those who had received their MD degrees seven to 35 years prior to the respective surveys; this corresponds to the sampling frame from which Sherman _et al._ drew their sample and excludes 8.9 percent of the APM/AAMC respondents. Tables D-6 and D-7 compare the Sherman _et al._ sample to the comparable segment of the APM/AAMC study population. As one can readily see in Table D-1, the "career age" distributions for the two populations are very similar.

Table D-1: NUMBER OF PHYSICIAN FACULTY BY NUMBER OF YEARS SINCE RECEIPT OF MD DEGREE

Years Since MD	Sherman *et al.* Medical Specialties		APM/AAMC Survey Group	
	N	%	N	%
More than 35	688	6.1	514	7.6
27-35	1,608	14.3	1,074	15.8
22-26	1,654	14.7	966	14.2
17-21	1,995	17.7	1,173	17.3
12-16	2,351	20.9	1,385	20.4
7-11	2,318	20.6	1,580	23.3
Less than 7	662	5.9	88	1.3
Total	11,276	100.0	6,780	100.0
Subset with 7-35 years since MD	9,926	88.2	6,180	91.1

Table D-2 shows means and standard deviations of age by stratum for both studies. Again, the adjusted figures are very similar in the two groups. This factor lends further credence to the comparability of the two study groups.

Table D-2: MEANS AND STANDARD DEVIATIONS OF AGE OF PHYSICIAN FACULTY BY NUMBER OF YEARS SINCE RECEIPT OF MD

Years Since MD	Sherman *et al.* Medical Specialties		APM/AAMC Survey Group	
	Mean	S.D.	Mean	S.D.
27-35	56.2	2.97	55.1	3.30
22-26	50.1	2.33	48.6	2.46
17-21	45.1	2.56	43.5	2.60
12-16	40.2	2.55	38.9	3.55
7-11	35.5	2.27	34.8	3.55

Table D-3 shows the relationship between rank and "career age" populations. The APM/AAMC study group tended to hold slightly higher rank than the Sherman *et al.* study group, but the differences were minimal.

Table D-3: PERCENTAGE OF PHYSICIAN FACULTY AT EACH ACADEMIC RANK BY NUMBER OF YEARS SINCE RECEIPT OF MD

Years Since MD	Sherman et al. Medical Specialties			APM/AAMC Survey Group		
	Prof.	Assoc.	Asst.	Prof.	Assoc.	Asst.
27-35	64.7	21.4	13.9	72.9	19.9	7.2
22-26	56.2	28.9	14.9	61.4	29.6	9.0
17-21	36.7	39.5	23.8	32.1	52.0	15.9
12-16	8.7	43.2	48.1	5.3	45.8	48.9
7-11	.8	10.9	88.3	.2	6.5	93.4

Table D-4 shows the percentages of faculty holding the PhD in addition to the MD. Overall, the APM/AAMC study group had a larger percentage of MD-PhDs in each "career age" category. This might be explained by the fact that internal medicine faculty are generally more likely to hold both degrees than are faculty in pediatrics, allergy, neurology and other departments categorized as "medical specialties."

Table D-4: PERCENTAGE OF PHYSICIAN FACULTY HOLDING MD-PhD DEGREES BY NUMBER OF YEARS SINCE RECEIPT OF MD

Years Since MD	Sherman et al. Medical Specialties	APM/AAMC Survey Group
27-35	6.9	8.9
22-26	6.3	9.9
17-21	6.3	6.9
12-16	4.8	5.8
7-11	4.7	7.4

Table D-5 compares the medical specialties segment of the Sherman *et al.* sampling frame to the APM/AAMC respondents with regard to post-doctoral research training as reported to the Faculty Roster. The two groups are very similar on this variable. This would tend to suggest that the research productivity and publication rates of the two groups should be comparable.

Table D-5: PERCENTAGE OF PHYSICIAN FACULTY REPORTING POST-DOCTORAL RESEARCH TRAINING TO FACULTY ROSTER SYSTEM

Years Since MD	Sherman et al. Medical Specialties	APM/AAMC Survey Group
27-35	35.1	39.8
22-26	40.7	36.5
17-21	40.9	41.4
12-16	40.4	35.4
7-11	37.7	40.0

Tables D-6 through D-7 compare the data collected from the APM/AAMC respondents to the data collected from the Sherman et al. sample, rather than from the entire medical specialties segment of the sampling frame. This being the case, it becomes possible to compute meaningful standard errors for the sample statistics and thus to determine whether or not the Sherman et al. sample has the same characteristics as the APM/AAMC respondents within specified confidence intervals. Sherman et al. did not report either standard deviations or standard errors for their sample statistics, but these summary statistics were available in AAMC files. The percentage of time spent in research was the only variable common to both studies on which a comparison could be made using statistical confidence intervals. Table D-6 presents mean percentage of time spent in research by stratum for the Sherman et al. medical specialties segment of the sample and for the APM/AAMC respondents. The upper and lower bounds of the 95 percent confidence intervals for the Sherman et al. means are also shown in this table. APM-AAMC survey respondents of all ages appear to spend less time in research than did respondents to the earlier survey. In three of the five strata, the APM/AAMC means lie outside the 95 percent confidence intervals of the Sherman et al. medical specialties means, i.e., they are significantly lower. This suggests that, in statistical terminology, the Sherman et al. sample was not drawn from the same population surveyed in the APM/AAMC study with regard to the percentage of time spent in research. It is possible that differences in methods of data collection and measurement, rather than actual differences in research activity, may account for these findings. The survey instrument used in the earlier study combined several different categories of research and research-related activities.

Table D-6: REPORTED PERCENTAGE OF TIME SPENT IN RESEARCH BY NUMBER OF YEARS SINCE RECEIPT OF MD

Years Since MD	Sherman *et al.* Medical Specialties			APM/AAMC Survey Group
	Mean	95% Confidence Interval		
		Upper Bound	Lower Bound	
27-35	27.3	39.5	15.1	23.8
22-26	42.1	57.0	27.2	26.5*
17-21	45.6	54.6	36.6	32.0*
12-16	36.9	47.1	26.8	35.2
7-11	41.7	50.9	32.4	27.8*

*APM/AAMC mean lies outside the 95% confidence interval of the Sherman *et al.* mean.

Publication Data

A large portion of the Sherman *et al.* report was devoted to analyses of the publication productivity of U.S. medical school faculty. The APM/AAMC survey also looked at faculty publication rates. Table D-7 compares the two study groups in terms of publication productivity. The raw data from on which to base statistical confidence intervals for the rates reported in Sherman *et al.* could not be located in AAMC files.

It should again be noted that the APM/AAMC study surveyed all internal medicine faculty, so the size of the study group was obviously much larger than the sample studied by Sherman *et al.*

Table D-7 shows the mean numbers of publications per year of respondents who graduated from medical school 7 to 35 years prior to the respective surveys.

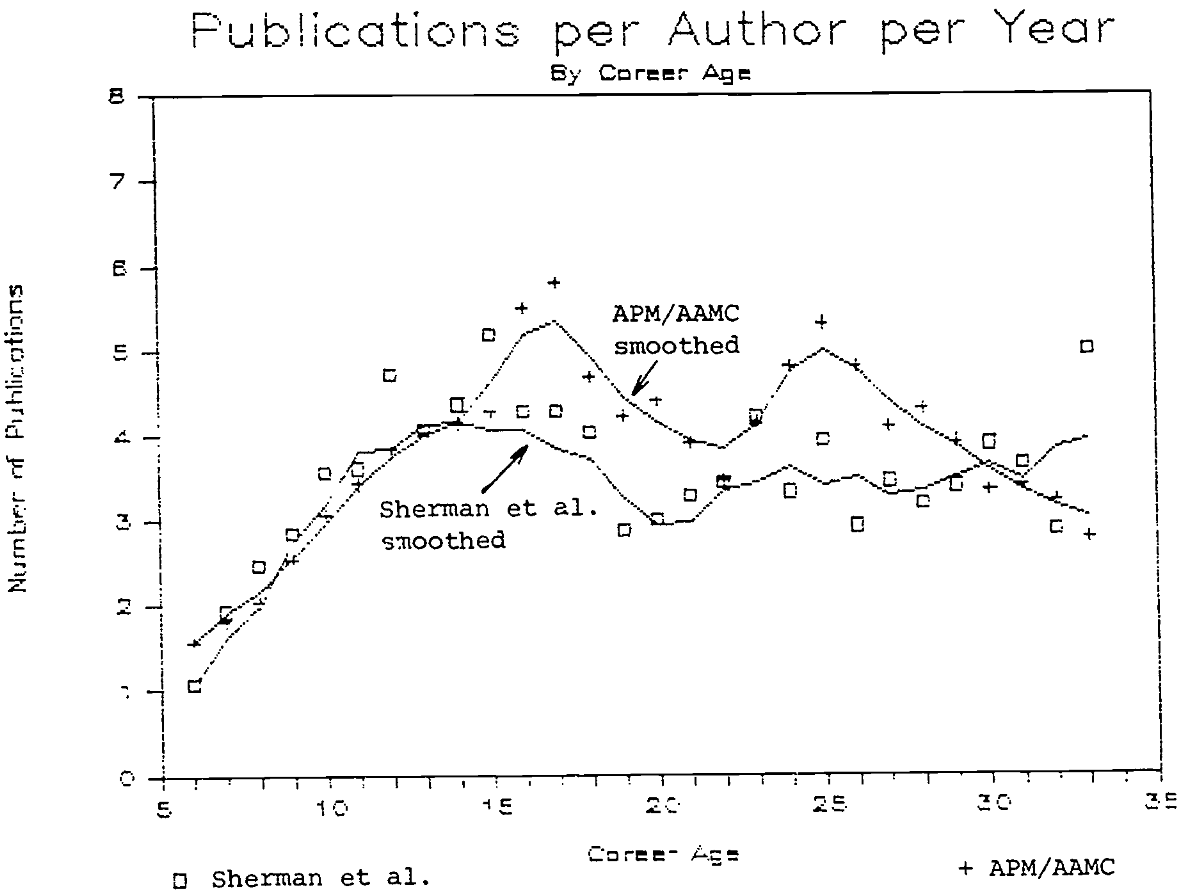
Table D-7: NUMBER OF PUBLICATIONS PER YEAR BY CAREER AGE

Career Age	Sherman et al. Medical Specialties		APM/AAMC Survey Group	
	N	Pub Rate	N	Pub Rate
6	27	1.07	145	1.58
7	27	1.93	478	1.81
8	27	2.48	693	2.04
9	27	2.85	730	2.54
10	21	3.57	742	3.06
11	41	3.61	620	3.69
12	28	4.71	562	3.85
13	28	4.07	555	4.04
14	28	4.36	575	4.14
15	22	5.18	535	4.29
16	43	4.28	511	5.51
17	25	4.28	511	5.80
18	25	4.04	490	4.69
19	25	2.88	451	4.21
20	18	3.00	420	4.40
21	32	3.25	438	3.91
22	18	3.44	422	3.47
23	18	4.22	386	4.14
24	18	3.33	376	4.81
25	14	3.93	353	5.32
26	30	2.93	314	4.82
27	20	3.45	305	4.09
28	20	3.20	303	4.32
29	20	3.40	320	3.92
30	18	3.89	284	3.35
31	17	3.65	207	3.41
32	16	2.88	192	3.23
33	11	5.00	154	2.79
34	9	--	149	2.97
35	6	--	88	3.26

Considering the methodological differences between the two studies, the publication rates shown in Table D-7 evidence remarkably similar patterns overall. Excluding the 34th and 35th years of "career age" (for which no comparison can be made), Sherman et al. reported higher publication rates in 12 "career age" categories while the APM/AAMC study found higher rates in the remaining 16. The Pearson product-moment correlation between the two columns of publication rates is .55.

Figure D-1 presents a graphic comparison of the APM/AAMC findings on publication rates to those of Sherman _et al_. This graph displays the same information contained in Table D-7. The graphic representation makes it easier to see the general correspondence between the two studies' findings regarding publication rates, despite methodological differences. Both studies found a sharp rise in average rates of publication from about the fifth through about the fifteenth year following MD graduation, followed by a "dip" that reaches its low point somewhere around the twentieth year. The APM/AAMC figures exhibit a second peak at about the twenty-fifth year that is not evident in the Sherman _et al_. data.

Figure D-1



Publications per Author per Year
By Career Age
Number of Publications
Career Age
APM/AAMC smoothed
Sherman et al. smoothed
8
7
6
5
4
3
2
1
0
5
10
15
20
25
30
35
□ Sherman et al.
+ APM/AAMC

Conclusions

The "medical specialties" segment of the population studied by Sherman *et al.* bears some statistical dissimilarities to the population studied by the APM and the AAMC with regard to research involvement. The APM/AAMC population is significantly less involved in research than was the population investigated by Sherman *et al.* The populations are demographically similar, but the measurement instruments were different. With regard to the number of publications per year, the two studies exhibited differences in detail, but there is a broad, general correspondence in their findings.

References

1. C. R. Sherman, H. P. Jolly, T. E. Morgan, E. J. Higgins, D. Hollander, T. Bryll, and E. R. Sevilla III. On the Status of Medical School Faculty and Clinical Research Manpower, 1968 - 1990. NIH Publication No. 82-2458. Bethesda, Maryland: National Institutes of Health, 1982.

2. H. N. Beaty, D. Babbot, E. J. Higgins, P. Jolly, and G. S. Levey. "Research Activities of Faculty in Academic Departments of Medicine." Annals of Internal Medicine, 104:90-97, 1986.

3. N. O. Gentile, G. S. Levey, P. Jolly, and T. H. Dial. "Research Activity of Full-Time Faculty in Departments of Medicine." Unpublished report, Washington, D.C., 1986.

Appendix E

NIH CLINICAL RESEARCH USAGE

In the study of research activity (Wave I), respondents were asked whether or not their current research made use of facilities in NIH-sponsored Clinical Research Centers (CRCs). One of the secondary research questions that arose during the course of the study was whether or not faculty who made use of NIH CRCs in their research activities had smaller amounts of laboratory space assigned to them, on the average, than those not using CRCs. As a preliminary step to addressing this question, we prepared a table (Table E-1) showing numbers and percentages of respondents who reported CRC usage by degree.

Table E-1
Distribution of Current NIH-Sponsored Clinical Research Center Usage by Degree

	MD		MD-PhD		PhD		Total	
	N	%	N	%	N	%	N	%
Doing Research Using NIH CRC	1020	15.5	113	20.7	111	17.2	1244	16.0
Doing Research Not Using NIH CRC	3374	51.1	324	59.2	444	68.7	4142	53.2
Not Doing Research	1550	23.5	71	13.0	45	7.0	1666	21.4
Missing	656	9.9	39	7.1	46	7.1	741	9.5
TOTAL	6600	100.0	547	100.0	646	100.0	7793	100.0

As Table E-1 shows, 16.0 percent of all Wave I respondents reported that they were making use of NIH-sponsored CRCs in research at the time of the survey. Among those known to be engaged in research, 23.2 percent of the MDs, 25.9 percent of the MD-PhDs, and 20.0 percent of the PhDs were using CRCs.

In Wave II, respondents were asked about Clinical Research Center usage during training. The results are summarized in Table E-2.

Table E-2
Distribution of Clinical Research Center
Usage During Training by Degree

Type of CRC	MD N	MD %	MD-PhD N	MD-PhD %	PhD N	PhD %	Total N	Total %
NIH	966	27.1	81	25.3	14	4.5	1061	25.3
VA	50	1.4	3	.9	3	1.0	56	1.3
Other	202	5.7	19	5.9	11	3.5	232	5.5
NIH & VA	6	.2	-	-	-	-	6	.1
NIH & Other	44	1.2	10	3.1	-	-	54	1.3
VA & Other	8	.2	-	-	-	-	8	.2
None	2146	60.1	188	58.8	225	72.3	2559	60.9
Missing	147	4.1	19	5.9	58	18.6	224	5.3
TOTAL	3569	100.0	320	100.0	311	100.0	4200	100.0

Of the known cases, 26.7 percent reported that they had used NIH CRCs during their research training. By a much wider margin than was the case with current CRC usage, PhDs were less likely than MDs or MD-PhDs to report that they had used a CRC during training.

The Wave I questionnaire asked respondents to separately estimate the area in square feet of their exclusive laboratory space and of the space they share with other researchers. The laboratory space measure used in this analysis is the greater of the two figures. This approach provides a single measure that is valid for the maximum number of respondents and at the same time avoids any possibility of double counting by those who might have exclusive space in a shared facility.

Table E-3 shows means and standard deviations of laboratory space in square feet by CRC usage and degree. Only respondents with valid degree codes, valid CRC usage codes, and valid nonzero laboratory space amounts are included in the table.

Table E-3
Means and Standard Deviations of Laboratory Space in Square Feet by Current NIH Clinical Research Center Usage and Degree

	MD			MD-PhD			PhD		
	N	Mean	St. dev.	N	Mean	St. dev.	N	Mean	St. dev.
Using NIH CRC	766	1194	2033	101	1455	2431	89	1070	1101
Not Using NIH CRC	2190	946	1444	250	935	958	389	1169	1500
TOTAL	2956	1010	1621	351	1085	1548	478	1151	1433

Differences among means in Table E-3 must be interpreted cautiously because of the large standard deviations. The only degree category in which the mean amount of space for nonusers was higher than that for users was the PhD category, and even there the difference was less than 100 square feet. Separate analyses of exclusive and shared space (not shown here) revealed similar patterns.

Appendix F

COMPARISONS OF SURVEY DATA TO THE NIH TRAINEE AND FELLOW FILE

One method for validating the findings in the Study of Research Training was to match the responses to Item F, "Source of Support for Training," to the NIH Trainee and Fellow File (TFF).

Prior to undertaking this match, the APM and AAMC considered the significance of NIH support for post-doctoral training among internal medicine faculty. Of particular interest was the extent to which NIH-supported training was supplemented by additional training supported by other sources. Table F-1 shows this "multiplier effect" to training support.

Among MDs with a single training experience, NIH supported approximately four months more training on the average than did other sources of support. For MDs with two training experiences, when NIH supported both experiences the first experience was on the average two months longer. This is also true for trainees who were initially supported by NIH and then received other support. MDs show a pattern of 20 months of NIH support to 16-18 months of other support.

MDs received on the average three months less of training when supported by NIH than when supported by others in a single training experience. NIH again provided two months more training, on the average, than other sources of support for individuals with two training experiences--27 months to 25 months.

Among PhDs with a single training experience, NIH supported an additional four months of training on the average. For PhDs with two training experiences, the first training experience was always longer for those who were supported by NIH for either the first experience, the second experience, or both. NIH paid for seven months more training than did other sources.

The NIH Trainee and Fellow File contains records for approximately 284,181 individuals supported since 1938. Of this group, 69,734 records or 24.5 percent have no social security number. The match was conducted by linking the social security numbers from the TFF to the respondent file from the Wave II survey. A further cut was made by selecting only those who were trainees or fellows after they received their doctorate.

The matched records were sorted into three groups: 1) NIH trainees only, 2) NIH fellows only, and 3) both fellows and trainees. Responses to the Wave II survey were also sorted in three categories: 1) those who indicated NIH support as a trainee, 2) those who indicated other means of support, and 3) those who either left the item blank or indicated that they did not know the source of support for their training. The resulting crosstabulation is displayed in Table F-1.

More than 73.6 percent of the respondents who indicated that NIH had supported their training were either NIH trainees or fellows. Of the others, who said they were supported by NIH but did not match to the TFF, some can be accounted for by the missing SSNs on the NIH file, and others may have assumed NIH support because they received monies from a training program that was primarily funded through NIH.

Nearly all (94.5 percent) of the respondents who indicated an "unknown" source of support or left this item blank were NIH trainees or fellows. Fewer than five percent of those who indicated some other source of support were NIH trainees or fellows.

Among the separate degree categories in Table F-2, PhDs were found to have the largest percentage of non-matches: 28.6 percent in contrast to 8.4 percent for MD-PhDs and 27.5 percent for MDs. All of the MD-PhDs who indicated "unknown" sources of support were funded by NIH. Among MDs and PhDs who cited unknown sources, 94.6 percent of the MDs and 88.9 percent of the PhDs were found to have been funded by NIH. Those who indicated other sources of support but were funded by NIH comprise 15.5 percent of the MDs, 4.1 percent were MD-PhDs and 46.3 percent of the PhDs.

While 26.4 percent of the Wave II respondents who were expected to have records in the TFF file did not, a slightly larger percentage of TFF records had missing SSNs. It is conceivable that the non-matches could be completely accounted for by missing data in the TFF. In any case, the level of reporting accuracy among those who did match is reassuring.

When individuals who matched to the TFF are compared to the rest of the survey population on the outcome measures, the importance of NIH training support becomes more evident.

Table F-3 shows the distribution of researchers and non-researchers for NIH-supported trainees and fellows, and for those whose records did not match to post-doctoral records in the TFF. These non-matchers are all individuals who reported that they had research training; thus they are assumed to have been trained with support from some source other than NIH. NIH-supported trainees are more likely than non-matchers to be researchers by a margin of nearly ten percentage points. The corresponding margin for NIH fellows is about 68 percentage points, and for those who were both trainees and fellows it is 70 percentage points.

MDs who were NIH-supported trainees or fellows are more likely than MD non-matchers to be researchers by margins ranging from almost 32 percentage points for trainees to almost 31 percentage points for fellows and more than 38 percentage points for those who were both trainees and fellows.

Among MD-PhDs, 94.2 percent of individuals who had both institutional training appointments and individual fellowships became researchers. There is a slight divergence from the pattern found among the MDs: 77.7 percent of the MD-PhD trainees became researchers as compared to 75.0 percent of the fellows. Only 47.7 percent of those who did not match became researchers.

PhDs who were NIH trainees or fellows are also more likely to be researchers than those who did not match, but the pattern is reversed: PhD trainees have the highest proportion and those who were both trainees and fellows have a lower proportion of researchers.

It is clear that NIH-supported post-doctoral research training has produced a large number and a sizeable proportion (67.1 percent) of the active researchers in the internal medicine faculty population.

Table F-4 shows the proportion of NIH PIs who were supported by NIH during training. Again, a very strong relationship between training support and becoming an NIH principal investigator is shown. Over all degree categories, former NIH fellows appear most likely to be NIH PIs, with 57.3 percent as opposed to 14.9 percent of those who did not match.

Within degree categories, MD-PhDs who had both institutional training grants and fellowships are more than twice as likely to be NIH PIs as all the MD-PhDs in the population. This is also true for PhDs who had NIH fellowships.

Finally, Table F-5 depicts the continuity of research support for former NIH trainees and fellows over a ten-year period. Interestingly, NIH trainees are more likely to have received continuous NIH research support than non-matchers, but they are also more likely never to have received support at all. Individuals who had fellowships or who had both training grants and fellowships are more likely to have had continuous support and include a lower proportion of individuals who have never received NIH grants. This general pattern seems to hold across all degree categories.

The results of the match to the NIH Trainee Fellow File emphasize that NIH support for training is correlated with later success as a researcher for internal medicine faculty members.

Table F-1

Distribution of Source of Support for Training by Multiple Research Training Experiences, Average Months in Training and Degree

Source of Support	MD N	MD %	MD Average Months First Training	MD Average Months Second Training	MD-PhD N	MD-PhD %	MD-PhD Average Months First Training	MD-PhD Average Months Second Training
One Training Experience								
NIH	1335	37.4	21.59	--	74	23.1	25.80	--
Other	1020	28.6	17.13	--	71	22.2	28.99	--
Two Training Experiences								
NIH Only	420	11.8	20.20	18.49	47	14.7	29.69	27.52
NIH and Other	300	8.4	20.45	18.31	34	10.6	27.31	25.13
Other and NIH	159	4.5	16.42	20.52	45	14.1	22.07	22.09
Other Only	303	8.5	16.66	15.31	43	13.4	24.33	22.05
Missing	32	.9			6	1.9		
TOTAL	3569	100.0			320	100.0		

PhD

Source of Support	N	%	Average Months First Training	Average Months Second Training
One Training Experience				
NIH	140	45.0	29.54	--
Other	47	15.1	25.69	--
Two Training Experiences				
NIH Only	61	19.6	24.79	22.04
NIH and Other	23	7.4	30.57	23.87
Other and NIH	19	6.1	27.31	24.63
Other Only	17	5.5	18.24	23.00
Missing	4	1.3		
TOTAL	311	100.0		

Table F-2
Distribution of Reported Source of Support for Training by Degree and NIH Trainee and Fellow File Codes

Reported Source of Support for Training

	MD						MD-PhD						PhD					
	NIH		Other		Unknown/ Missing		NIH		Other		Unknown/ Missing		NIH		Other		Unknown/ Missing	
NIH TFF	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
NIH Trainee	1005	48.9	99	7.6	120	55.1	91	58.7	4	2.7	8	42.1	58	25.9	8	11.6	11	61.1
NIH Fellow	85	4.1	17	1.3	73	33.5	3	1.9	2	1.4	7	36.8	32	14.3	9	13.0	4	22.2
Both Trainee & Fellow	400	19.5	85	6.6	13	6.0	48	31.0	-	-	4	21.0	70	31.3	15	21.7	1	5.6
Non-Match	565	27.5	1095	84.5	12	5.4	13	8.4	140	95.9	-	-	64	28.6	37	53.7	2	11.1
TOTAL	2055	100.0	1296	100.0	218	100.0	155	100.0	146	100.0	19	100.0	224	100.0	69	100.0	18	100.0

Total

	NIH		Other		Unknown/ Missing	
NIH TFF	N	%	N	%	N	%
NIH Trainee	1154	47.4	111	7.3	139	54.5
NIH Fellow	120	4.9	28	1.9	84	32.9
Both Trainee & Fellow	518	21.3	100	6.6	18	7.1
Non-Match	642	26.4	1272	84.2	14	5.5
TOTAL	2434	100.0	1511	100.0	255	100.0

Table F-3

Distribution of Researchers and Non-Researchers by Degree and NIH Trainee Fellow File Codes

	MD					MD-PhD					PhD				
	Non-Researcher		Researcher		% Rsch	Non-Researcher		Researcher		% Rsch	Non-Researcher		Researcher		% Rsch
	N	%	N	%		N	%	N	%		N	%	N	%	
NIH Trainee	513	29.2	711	39.2	58.1	23	21.1	80	37.9	77.7	6	9.0	71	29.1	92.2
NIH Fellow	56	3.2	119	6.6	68.0	3	2.8	9	4.3	75.0	7	10.4	38	16.6	84.4
Both Trainee and Fellow	126	7.2	372	20.5	74.7	3	2.8	49	23.2	94.2	13	19.4	73	29.9	84.9
Non-Match	1062	60.4	610	33.7	36.5	80	73.4	73	34.6	47.7	41	61.2	62	25.4	61.4
TOTAL	1757	100.0	1812	100.0	50.8	109	100.0	211	100.0	65.9	67	100.0	244	100.0	78.5

	Total				
	Non-Researchers		Researchers		% Rsch
	N	%	N	%	
NIH Trainee	542	28.0	862	38.0	61.5
NIH Fellow	66	3.4	166	7.3	71.6
Both Trainee and Fellow	142	7.3	494	21.8	77.7
Non-Match	1183	61.2	745	32.9	38.6
TOTAL	1933	100.0	2267	100.0	54.0

Table F-4
Distribution of NIH Principal Investigators and Non-PIs
by Degree and NIH Trainee Fellow File

	MD					MD-PhD					PhD				
	Not NIH PI		NIH PI		% PI	Not NIH PI		NIH PI		% PI	Not NIH PI		NIH PI		% PI
	N	%	N	%		N	%	N	%		N	%	N	%	
NIH Trainee	853	32.7	371	38.5	30.3	63	28.8	40	39.6	38.8	43	21.5	34	30.6	43.0
NIH Fellow	75	2.9	100	10.4	57.1	5	2.3	7	6.9	58.3	19	9.5	26	23.4	57.8
Both Trainee and Fellow	266	10.2	232	24.1	46.6	19	8.7	33	32.7	63.5	41	20.5	45	40.5	52.3
Non-Match	1411	54.2	261	27.1	15.6	132	60.3	21	20.8	13.7	97	48.5	6	5.4	5.8
TOTAL	2605	100.0	964	100.0	27.0	219	100.0	101	100.0	31.6	200	100.0	111	100.0	35.7

Total

	Not NIH PI		NIH PI		% PI
	N	%	N	%	
NIH Trainee	959	31.7	445	37.8	31.7
NIH Fellow	99	3.3	133	11.3	57.3
Both Trainee and Fellow	326	10.8	310	26.4	48.7
Non-Match	1640	54.2	288	24.5	14.9
TOTAL	3024	100.0	1176	100.0	28.0

Table F-5
Continuity of Support for NIH Principal Investigators by Degree and NIH Trainee and Fellow File Codes

	MD								MD-PhD							
	Continuously		Formerly		Recently		Never		Continously		Formerly		Recently		Never	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
NIH Trainee	261	21.3	120	9.8	72	5.9	771	63.0	33	32.0	12	11.7	9	8.7	49	47.5
NIH Fellow	67	38.3	13	7.4	26	14.9	69	39.4	3	25.0	3	25.0	2	16.7	4	33.3
Both Trainee and Fellow	184	36.9	71	14.3	53	10.6	190	38.2	24	46.2	10	19.2	4	7.7	14	26.9
Non-Match	221	13.2	281	16.8	281	16.8	889	53.2	37	24.2	16	10.5	40	26.1	60	39.2
TOTAL	733	20.5	485	13.6	432	12.1	1919	53.8	97	30.3	41	12.8	55	17.2	127	39.7

	PhD								Total							
	Continuously		Formerly		Recently		Never		Continously		Formerly		Recently		Never	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
NIH Trainee	21	27.3	10	13.0	4	5.2	42	54.5	315	22.4	142	10.1	85	6.1	862	61.4
NIH Fellow	21	46.7	4	8.9	7	15.6	13	28.9	91	39.2	20	8.6	35	15.1	86	37.1
Both Trainee and Fellow	33	38.4	4	4.7	13	15.1	36	41.9	241	37.9	85	13.4	70	11.0	240	37.7
Non-Match	25	24.3	4	3.9	26	25.2	48	46.6	283	14.7	301	15.6	347	18.0	997	51.7
TOTAL	100	32.2	22	7.1	50	16.1	139	44.7	930	22.1	548	13.0	537	12.8	2185	52.0