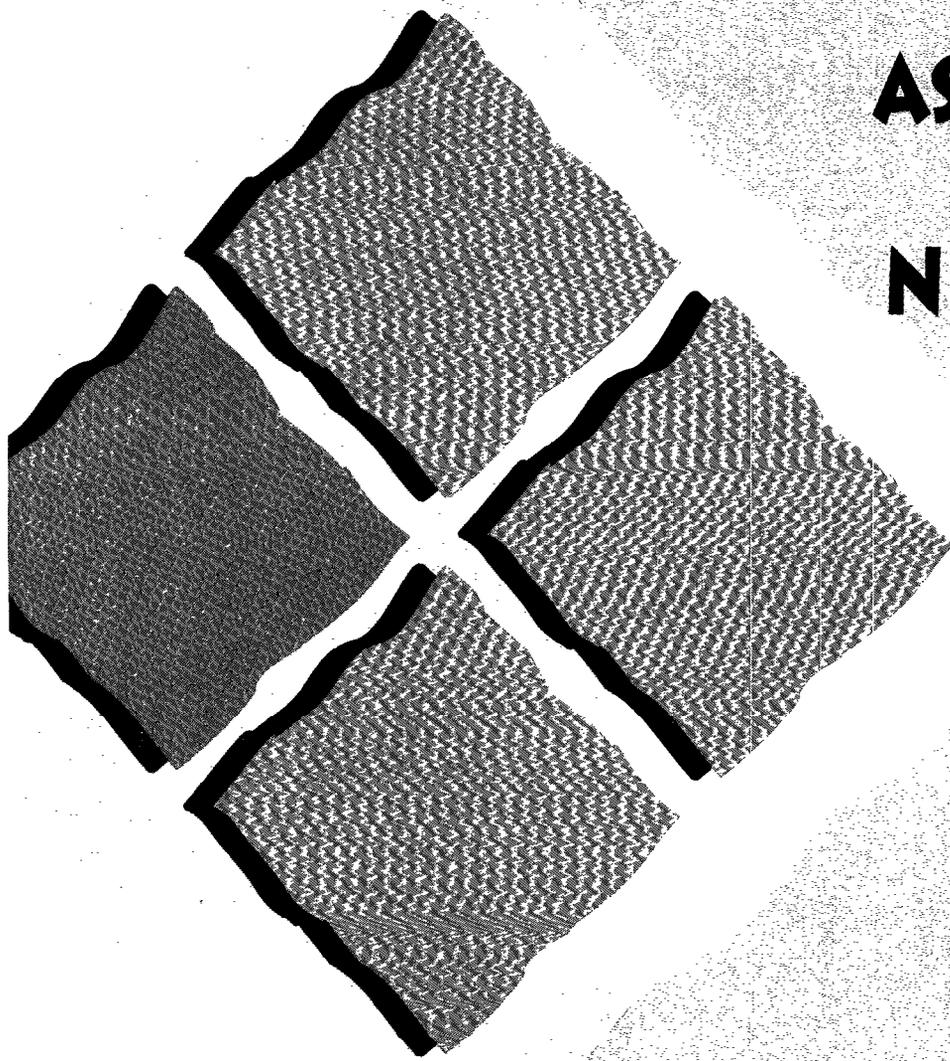
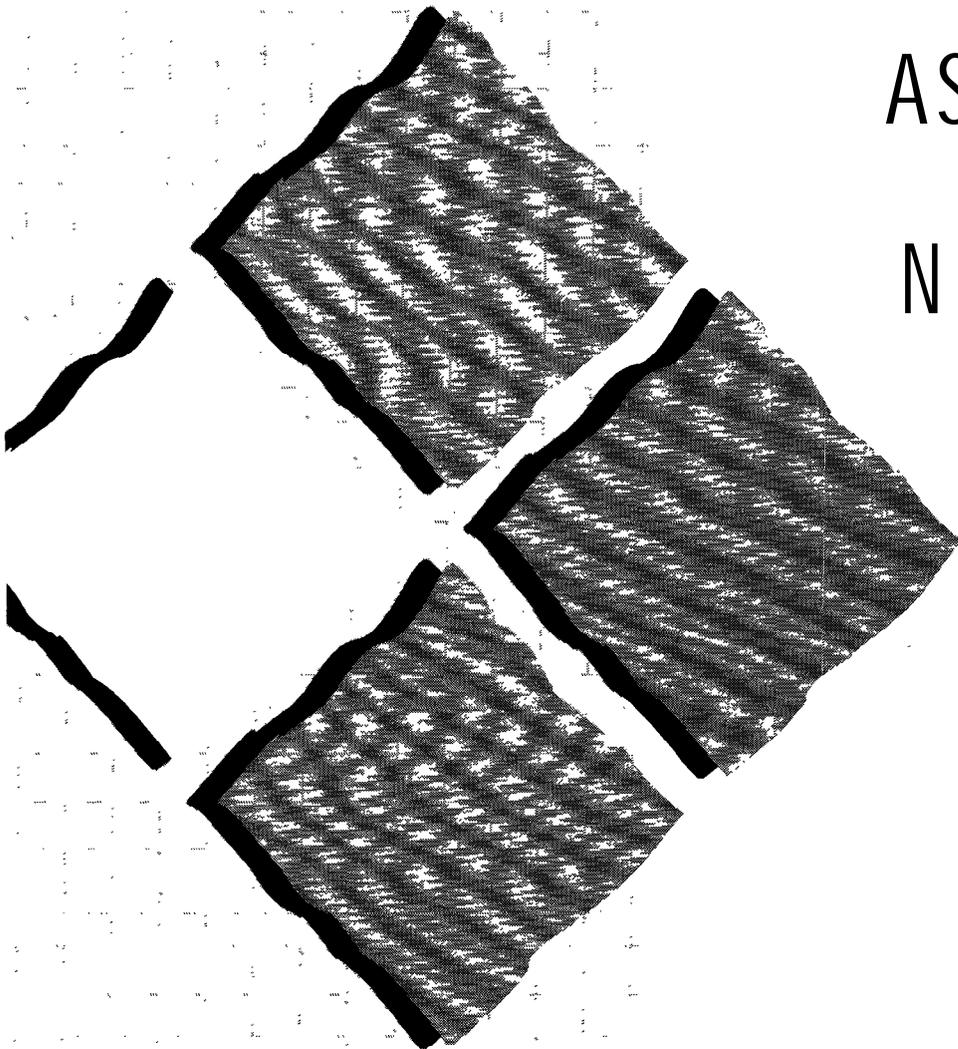


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**ASSESSMENT OF
NIH MINORITY
RESEARCH/
TRAINING
PROGRAMS
PHASE 1**



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HEALTH



ASSESSMENT OF
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June 1993

OFFICE OF
RESEARCH ON
MINORITY
HEALTH

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 NIH Director 102

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This Phase I Assessment of NIH Minority Research/Training Programs represents a collaborative effort on the part of many dedicated individuals.

Members of the NIH Minority Programs Evaluation Committee were instrumental in providing guidance on the overall approach to evaluating NIH minority research/training programs, reviewing data submitted by ICD directors, suggesting areas where additional information was needed, and critiquing the final Phase I report. Dr. Donald Luecke, Deputy Director, Division of Research Grants, played a key role as co-chair of the Committee. A list of the names and affiliations of the Evaluation Committee members is provided on the following page.

A number of NIH administrators and staff contributed a significant amount of time to the project. I acknowledge with gratitude, in addition to members of the Evaluation Group, the assistance of Lucille Nierzwicki (DRG), Carol Bleakley (DRG), Martin Blumsack (NCRR), Janyce Hedetniemi (NIGMS), and James Onken (NIGMS). Laura Brown of the Office of Research on Minority Health (ORMH) (formerly the Office of Minority Programs) made a substantial contribution to the project, assuming responsibility for Section 5 of the report. Suzanne Aubuchon (ORMH) also provided valuable administrative assistance.

The Office of Research on Minority Health contracted with Prospect Associates to coordinate the design of the Phase I Assessment, oversee the collection of additional data, and produce the final Phase I report, integrating recommendations of the NIH Minority Programs Evaluation Committee. Dr. Marcia Carlyn served as project director. Other members of the Prospect team included Cynthia Lampkin and Erin P. Dabbs.

I am very thankful to all of the above-mentioned individuals for their significant contributions to this important project.

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EXECUTIVE SUMMARY

The Minority Programs Evaluation Committee of the National Institutes of Health (NIH), convened in 1992 by the Associate Director for Research on Minority Health, ORMH, conducted a review of NIH efforts to recruit underrepresented minorities to biomedical and behavioral research. This assessment was designed for the following purposes:

- ◆ To present a broad picture of NIH extramural research/training support, including trend data for minority applicants and recipients of traditional nontargeted NIH research grants and postdoctoral fellowships.
- ◆ To describe key features of each of the NIH minority research/training programs and display available data on the number of underrepresented minority investigators and students who have been supported as well as the overall levels of support provided.
- ◆ To examine NIH data collection activities and recommend improvements that may be needed to conduct comprehensive assessments of targeted programs.
- ◆ To present results from other studies of NIH minority research/training programs.
- ◆ To examine the need for a comprehensive evaluation of NIH minority research/ training programs.

HIGHLIGHTS OF THE REPORT

The findings and recommendations of this document, the first NIH-wide assessment of minority research/training programs, are detailed in several major sections:

- ◆ *Overview of NIH Extramural Research/Training Support.* To gain an understanding of the overall effectiveness of the various NIH minority research/training programs, a broad picture of NIH extramural research/training support is presented. Trend data for minority applicants and recipients of traditional nontargeted NIH research grants

and postdoctoral fellowships are shown from FY 1982 to 1991, including trends in the average dollar size of awards and the total amount and percent of support to underrepresented minority principal investigators. Taken together, the trend data indicate that the various NIH minority research/training programs appear to have had only a modest effect on the number of underrepresented minorities who have applied for and/or received traditional nontargeted NIH extramural research grants and postdoctoral fellowships.

- ◆ *NIH Minority Research/Training Support Programs.* Descriptions of each of the major NIH minority research/training programs are presented, including data on the number of individuals who have been supported and the overall levels of support provided, showing trends through time as well as available outcome data. In addition, several smaller Institute-specific minority research/training programs are described as well as an innovative new program, “Bridges to the Future,” which is designed to provide incentives and support to underrepresented minority students at two key transition points in their academic careers. The different programs underscore NIH’s commitment over the past 20 years to attempt to increase the number of underrepresented minorities who pursue research careers.
- ◆ *Limitations of Current NIH Data Collection Procedures.* Several limitations inherent in the current NIH systems for tracking individuals who receive research/training support are identified, such as the voluntary provision of Social Security numbers and the requirements of the Privacy Act which prevent the permanent merging of computerized NIH data files.
- ◆ *Other Studies of NIH Minority Research/Training Programs.* Several major assessments of NIH research/training programs-including minority programs-are discussed. Three types of reports and activities are presented:
 - Reports written under the auspices of the Committee on National Needs for Biomedical and Behavioral Research Personnel of the Institute of Medicine.
 - Documents that include a review of the status of minorities in biomedical research.

— NIH evaluation activities.

Several current assessments are described that are relevant to future evaluations of NIH minority research/training programs. One of the most important is a comprehensive evaluation of the MARC Honors Undergraduate Research Training Program that was recently approved for implementation by the National Institute of General Medical Sciences (NIGMS) .

All of the studies conducted to date have been successful in identifying some of the strengths and weaknesses of NIH minority research/training programs, although they have been less effective in evaluating how successful these programs have been in achieving their stated objectives.

The trend data compiled for this report showed an overall pattern of minority underrepresentation in the biological sciences which has continued throughout the period, although there has been moderate improvement in recent years in the number and proportion of Ph.D.'s earned by underrepresented minorities.

RECOMMENDATION: A THREE-PHASE PROGRAM EVALUATION

To address this challenging problem, the NIH Minority Programs Evaluation Committee concluded that a broad and relatively straightforward evaluation of NIH minority research/training programs is needed. In order to adequately assess how the various programs could be improved and prospectively evaluate the extent to which they are achieving their programmatic objectives and long-term goals, a three-phase program evaluation is recommended:

- ◆ Phase 1. The present report to Dr. Bernadine Healy, NIH Director, was designed to set the stage by presenting available information and trend data for the different NIH minority research/ training programs.
- ◆ Phase 2. This planning phase would involve the implementation of a feasibility study to design a prospective evaluation of NIH minority research/training programs. Features of this system would include the development of criteria for successful outcomes, a needs

assessment, creation of a trans-NIH computerized system to track individuals who receive NIH research/training support, a design for retrospective analyses of long-standing programs, and a routine reporting system for providing feedback to program managers.

- ◆ Phase 3. Recommended implementation phase activities include additional revision of several grant application and appointment forms and the amendment of one or more NIH systems of records currently authorized under the Privacy Act to permit broader collection of racial/ethnic data and personal identifying information for recipients of NIH funds. Phase 3 would also include implementation of a computerized tracking system and other prospective analytic techniques, as well as a routine reporting system, retrospective analyses, and periodic evaluation studies, using valid comparison groups whenever possible. Model programs would be identified and specific recommendations would be made for improving each of the NIH minority research/training programs.

BENEFITS OF A COMPREHENSIVE EVALUATION

This type of broad-based evaluation effort will accomplish several goals:

- ◆ Ensure accountability of NIH minority research/training programs.
- ◆ Maximize the effectiveness of limited resources.
- ◆ Enable administrators to better understand the complexity of the problems being addressed by their programs.
- ◆ Reduce the gap between expected and actual outcomes.

Ultimately, the National Institutes of Health will be greatly served through its ability to increase the number of research scientists who are members of racial/ethnic groups currently underrepresented in the biological sciences. This Phase 1 report and the other evaluation activities proposed by the NIH Minority Programs Evaluation Committee are recommended to help achieve this goal and thereby enhance the future of biomedical and behavioral research.

INTRODUCTION

The National Institutes of Health (NIH) is the principal biomedical research arm of the Department of Health and Human Services (DHHS). Its overall mission is to improve the health of the American people through the acquisition of new knowledge in diseases and disease prevention, including research in the basic sciences. Through congressional appropriations, the NIH funds biomedical and behavioral research related to a broad spectrum of diseases and health problems. Funds are also provided for training research investigators to maintain and enhance the quality of biomedical and behavioral research in the future.

To help accomplish its mission, the NIH is dedicated to increasing the number of scientists who are members of minority groups currently underrepresented in biomedical and behavioral research. The following racial/ethnic groups are currently underrepresented in biomedical and behavioral research nationally: Native Americans, Hispanics, African Americans, and Pacific Islanders. NIH's commitment is based on the premise that a growing pool of such experienced minority researchers will contribute greatly to progress in minority health, strengthen biomedical and behavioral research in general, and address the potential research labor shortage in the 21st century.

The impending shortage in the number of well-trained biomedical and behavioral researchers in this country has been noted in several recent publications. In *Changing America: The New Face of Science and Engineering*, the congressionally established Task Force on Women, Minorities, and the Handicapped in Science and Technology estimated that to avoid a serious shortage of scientific personnel, there must be a significant increase in the number of minorities with doctoral degrees in science and engineering.' Demographic trends show that, by the year 2000, approximately one-third of new entrants into the general work force will be minorities. Yet, as noted in the Task Force's report, relatively few minorities have been attracted to science careers in the past.

There is clearly an urgent need to obtain more comprehensive knowledge about minority students at all stages of the academic pipeline. In its 1989 report on National Research Service Award (NRSA) training programs, *Biomedical and*

Behavioral Research Scientists: Their Training and Supply, the Committee on Biomedical and Behavioral Research Personnel of the Institute of Medicine (IOM) emphasized the need for evaluation studies on the recruitment and retention of biomedical and behavioral researchers, including survey studies of former trainees.²

The need for additional research was underscored by the findings of the IOM's *Summary Report 1990: Doctorate Recipients from United States Universities*.³ The report included a special section on trends in the number of doctorates earned by each major American racial/ethnic group during the period 1975 to 1990. Overall, the proportion of doctorates earned by underrepresented minorities in the fields of biological sciences and chemistry increased during this period from 2.4 percent to 3.7 percent. Hispanics showed the greatest gains, with the number of doctorates increasing from 35 Ph.D.'s in 1975 to an average of 88 Ph.D.'s per year from 1984 to 1990. Native Americans also showed some gains, although the number of Ph.D.'s awarded to Native Americans was small, increasing from 1 Ph.D. in 1975 to an average of 14 Ph.D.'s per year from 1984 to 1990. The overall trend was not upward, however, for African Americans. The number of Ph.D.'s in biological sciences and chemistry awarded to African Americans decreased from 66 Ph.D.'s in 1975 to an average of 56 Ph.D.'s per year from 1984 to 1990. There were significant gender differences, however. The number of Ph.D.'s in biological sciences and chemistry earned by African-American women increased from 16 in 1975 to 20 in 1990, whereas the number of Ph.D.'s in these fields earned by African-American men decreased from 50 in 1975 to 20 in 1990.

These findings reveal that although there has been moderate improvement in recent years in the number and proportion of Ph.D.'s earned by underrepresented minorities, the overall pattern of minority underrepresentation in the biological sciences has continued throughout the period.

The NIH has used several types of funding mechanisms over the past 20 years to support the research training and research opportunities of minority individuals attending academic institutions around the country. More than a dozen NIH research/training programs are currently targeted for underrepresented minorities at the high school, college, graduate, and postgraduate levels. While some of these programs are trans-NIH in scope and are offered by many of

the Institutes, Centers, and Divisions (ICD's) that make up the NIH, others are unique to particular NIH components.

This assessment of current NIH minority research/training programs was designed for the following purposes:

- ◆ To present a broad picture of NIH extramural research/training support, including trend data for minority applicants and recipients of traditional nontargeted NIH research grants and postdoctoral fellowships.
- ◆ To describe the key features of each of the NIH minority research/training programs and display available data on the number of underrepresented minority investigators and students who have been supported by each of the programs and the overall levels of support provided.
- ◆ To examine the need for a comprehensive and continuous evaluation of the targeted minority programs and propose a plan for such an evaluation.
- ◆ To examine past and current NIH data collection activities and recommend improvements that may be needed to conduct comprehensive assessments of targeted programs.
- ◆ To present results and recommendations from other studies of NIH minority research/training programs.

The findings reveal that a comprehensive evaluation of the targeted minority programs is indeed warranted. A three-phase plan for such an evaluation is proposed in Section 6 that includes recommendations for conducting improved retrospective data analyses as well as a prospective broad-based evaluation designed to measure the long-term impact of the various NIH programs.

The NIH Minority Programs Evaluation Committee strongly recommends that this report serve as Phase 1 of a proposed three-phase evaluation of NIH minority research/training programs. The primary intent of the Phase 1 assessment is to set the stage for a comprehensive evaluation by presenting available information and trend data for each of the NIH minority research and research training programs. Evaluative conclusions cannot be made at this point, primarily because of the limitations of current databases and data collection procedures. There is a clear need to improve current

procedures to better understand the effectiveness of the targeted programs. Specific recommendations for such a comprehensive evaluation are described in Section 6 of the report.

This Phase 1 report underscores the commitment of the NIH to evaluate its minority research/training programs for the purpose of maximizing their long-term effectiveness. Increasing the number of underrepresented minorities who pursue research careers in the biomedical and behavioral sciences is an important goal in the achievement of NIH's overall mission to improve the health of the American people.

SECTION 1: BACKGROUND

The need to assess the effectiveness of the minority research/training programs sponsored by the NIH is clearly recognized by the Director of NIH, the Associate Director for Research on Minority Health, and senior administrators throughout the NIH. Although a few evaluation studies and partial analyses of specific programs have been conducted in recent years, and additional studies are currently under way, there is a recognized need in this age of accountability to use a comprehensive approach to evaluating NIH minority research/ training programs prospectively as well as retrospectively.

Incorporating program evaluation as an integral part of the managerial decisionmaking process is important for several reasons. It enables NIH staff to:

- ◆ Better understand the complexity of the problems being addressed by the different minority research/ training programs.
- ◆ Assess the current success of specific programs in achieving their goals and objectives.
- ◆ Develop strategies for improving the programs.
- ◆ Reduce any discrepancies between expected outcomes and actual outcomes.

A comprehensive evaluation of the NIH minority research/ training programs was also recommended by the Minority Programs Fact-Finding Team that was convened in 1991 by the NIH Office of Research on Minority Health (ORMH), formerly the Office of Minority Programs, and given a twofold mission: (1) to recommend ways in which the NIH could help extend healthy life and reduce the burden of illness among minorities through targeted research and (2) to recommend how the NIH could significantly increase the participation of underrepresented minorities in all phases of biomedical research. After gathering information and ideas from nearly 1,000 representatives of the biomedical and life sciences community around the country, the 53-person advisory Fact-

Finding Team recommended that the NIH should continue funding its full array of programs and development of minority biomedical scientists, but should also evaluate the programs to identify which components have been most successful. Following such an evaluation, the most effective programs should be strengthened through improvements in design and cost effectiveness so that they could be expanded to assist a larger number of potential researchers. Members of the Minority Programs Fact-Finding Team are listed in the Appendix.

To implement the recommendations of the Minority Programs Fact-Finding Team, NIH Director Dr. Bernadine Healy in 1992 proposed to a House Appropriations subcommittee that an ambitious Minority Health Initiative be funded that would include a comprehensive evaluation of the level of support and effectiveness of NIH efforts to recruit underrepresented minorities to research. The proposal was well received, and an NIH Minority Programs Evaluation Committee was convened by the NIH Associate Director for Research on Minority Health in June 1992 to help develop the design for this broad evaluation effort. The Committee is comprised of senior administrators representing a variety of NIH components who have an in-depth knowledge of NIH minority research/training programs, as well as the nontargeted NIH research and research training programs. Members of the NIH Minority Programs Evaluation Committee are listed in the Acknowledgments section of the report.

The NIH Minority Programs Evaluation Committee met during the summer and winter of 1992 and discussed the myriad of challenges involved in assessing NIH minority research/training programs, and how they should be examined. Specific challenges include the following:

- ◆ The collection of racial/ethnic data is particularly difficult due to the generally sensitive nature of such information and the potential to use it in a discriminatory manner. Therefore, the NIH has adopted a policy of encouraging, but not requiring, racial/ethnic information to be submitted on application forms for NIH support.
- ◆ Voluntary submission of racial/ethnic data by principal investigators and project directors applying for research grants and by individuals applying for fellowships has been included on NIH application forms since 1981, but

race/ethnicity is not currently collected for other individuals participating in the scientific execution of projects supported by nontargeted research grants, including collaborating investigators, students, and support staff. In addition, racial/ethnic information is not requested of individuals applying for Small Business Innovation Research (SBIR) Program grants or other individuals involved in SBIR research projects.

- ◆ Not until September 1991 had the NIH been permitted to collect the race/ethnicity of individuals receiving monetary support as trainees under NIH institutional training grants or as appointees under career development program awards for which institutions select and appoint individuals.
- ◆ On those NIH forms where racial/ethnic information is requested, in nearly all cases Asians are grouped with Pacific Islanders so that it is impossible to distinguish Pacific Islanders-an underrepresented minority group, from Asians-who are not currently underrepresented in biomedical research.
- ◆ The collection of a set of personal identifiers for individuals who receive research/training support-such as the individual's name and Social Security number in combination with the person's date of birth, gender, and race/ethnicity-requires strict adherence to the Privacy Act. Uniform collection of such information has not been standard practice for most NIH programs.
- ◆ The tracking of individuals retrospectively as well as prospectively over extended periods to determine if they have received Ph.D. degrees and/or are pursuing careers in biomedical research is labor intensive and difficult to achieve even when personal identifiers are available.
- ◆ Prospective evaluation studies that involve comparison groups are the most informative, but it is challenging, and sometimes impossible, to identify a suitable comparison group that can be tracked through time along with the group being studied.
- ◆ Obtaining prior clearance by the Office of Management and Budget (OMB) for surveys of 10 or more individuals is an administrative requirement that serves to extend by at least

several months the planning phase of each evaluation study.

- ◆ Effective evaluations require clear specification of the long-term goals and programmatic objectives of each program being evaluated, a process that has not been consistently used with respect to some of the NIH research/training programs.

Despite these and other significant challenges, the need for a comprehensive prospective evaluation of all NIH minority research/training programs is strongly supported by the NIH Minority Programs Evaluation Committee. This report summarizes the recommendations of the Committee and has been designed to set the stage for a broad-based evaluation.

The report begins with an overview of NIH extramural research/training support, including trend data for minority applicants and recipients of traditional nontargeted NIH research grants and postdoctoral fellowships. A summary description of the nature and magnitude of each of the major NIH minority research/training programs makes up a large portion of the report; available data are presented on overall funding levels as well as the number of individuals who have been supported by each of these programs, showing trends through time. Available outcome data on the estimated number of NIH-supported minority program trainees and student research assistants who subsequently earned Ph.D. degrees are also presented.

Specific limitations of current NIH data collection procedures are described in the report, including how current procedures make it difficult to conduct prospective and retrospective evaluations. In addition, findings are summarized from other evaluation studies and analyses that have been completed or are currently under way. The report concludes with the Evaluation Committee's proposed outline for a three-phase evaluation effort that uses a comprehensive approach to evaluating NIH minority research/training programs prospectively. Such an evaluation is needed to obtain more complete and reliable data on the academic and career outcomes of individuals who have received research/training support from the NIH—information that is critically needed to reduce the gap between expected and actual outcomes of these important programs.

Throughout the report, the phrase “underrepresented minorities” refers to African Americans, Hispanics, and Native Americans, unless otherwise noted. In most cases, totals displayed of collective minority groups exclude Pacific Islanders, a group that is also underrepresented in biomedical science, because current NIH data collection procedures do not generally distinguish between Pacific Islanders and Asians—a group that is not underrepresented. Also, unless otherwise noted, dollar figures represent current dollars that have not been adjusted for inflation. For each set of data presented in the report, the data source is specified in a footnote below the figure describing the data.

Finally, it should be noted that racial/ethnic statistics presented in the report are based on *self-reported* data voluntarily submitted on NIH application forms. A process has been developed to increase the proportion of NIH research grant and fellowship applicants whose race/ethnicity is identifiable, from an average of 76 percent to an average of 95 percent over the 10-year period from FY 1982 through 1991. This process is described in Section 4 (see figure 34), and the IMPAC data presented in this report reflect the enriched race/ethnicity data. However, a varying number of applications and subsequent awards involve individuals who have never reported their race/ethnicity to the NIH. Such applications and awards are categorized under “race not reported” in the figures presented in the report, and percentages of underrepresented minorities shown in the figures are based on the applications and awards where race/ethnicity was available. It should be understood that the validity of the trend data presented in figures 1 through 13 may be affected to some extent by this partial underreporting of race/ethnicity.



SECTION 2: OVERVIEW OF NIH EXTRAMURAL RESEARCH/TRAINING SUPPORT

To gain an understanding of the overall effectiveness of the various NIH minority research/ training programs, a broad picture of NIH extramural research/training support is presented in this section. Trend data for minority applicants and recipients of traditional nontargeted NIH research grants and postdoctoral fellowships are shown from FY 1982 to 1991, a period when one would expect to see a positive effect from the minority programs that were established by the NIH in the early 1970's.

From a broad perspective, the total NIH budget for FY 1991 was \$8.2 billion compared with \$3.6 billion in FY 1982, with a large proportion of the overall NIH budget being allocated to extramural awards (83 percent in FY 1991). Extramural awards include research grants, cooperative agreements, R&D contracts, NRSA, construction grants, medical library grants, international training grants in epidemiology, and grants for repair, renovation, and modernization of existing research facilities.

During the 10-year period of FY 1982 to 1991, there was a gradual rise in the percentage of total NIH extramural funding awarded to research grants (from 82 percent to 84 percent), and the overall funding for research grants rose substantially over the period, from \$2.4 billion to \$5.7 billion (a 137 percent increase using current dollars). The "real" rate of increase in research grant awards, however, as measured by deflating current dollars by the Biomedical R&D Price Index (BRDPI), was 50 percent—a more moderate increase over the 10-year period.

Research grants have consistently made up the largest proportion of extramural awards (84 percent in FY 1991). The general types of research grants awarded by the NIH are:

- ◆ Research project grants (RPG's), which are awards to eligible institutions to support a principal investigator working on a specific research project or a group of investigators working on research projects that contribute to a broadly based multidisciplinary research program.

- ◆ Research center grants, which are awards to institutions to support long-term programs of research and development involving groups of collaborating investigators using shared resources and facilities.
- ◆ “Other” research grants, which include awards to individuals and institutions to support other research-related programs, such as research career awards, biomedical research support and development awards, and cooperative agreements for clinical trials.

The first type, RPG's, accounted for most of the increase in research grant funding from FY 1982 to 1991. During this period, RPG's rose from 63 percent to 67 percent of total extramural awards. Dollars awarded to traditional research projects (R01's) rose from \$1.5 billion in FY 1982 to \$2.9 billion in FY 1991, although their proportion of the total extramural awards dropped from 50 percent to 43 percent. In addition to the R01, newer grant mechanisms contributed to the increased funding for RPG's, including FIRST awards (R29, First Independent Research Support and Transition), MERIT awards (R37, Method to Extend Research in Time), and SBIR grants (R43 and R44, Small Business Innovation Research).

Examining *all* NIH research grants (RPG's, research center grants, and other research grants), recent trend data for underrepresented minority individuals who served as principal investigators or project directors on research grants are presented in figures 1 through 3. Figure 1 shows that there has been a gradual increase from FY 1982 to 1991 in the total number of competing and noncompeting research grants directed by underrepresented minorities. The percentage of awards has remained quite constant (approximately 2.7 percent) over the past few years, a bit higher than it was in the early 1980's. Although the number of awards to African Americans peaked in 1987 and has decreased somewhat since then, the overall trend for the decade is slightly upward for African Americans as well as for other under-represented minority groups.

Similarly, examining only the competing research grants, an increase was found in the number of awards to underrepresented minority individuals (see figure 2). In addition, the percentage of total competing awards has increased from 2.5 percent to 3.2 percent over the past few years. The number of applications by underrepresented

minority individuals for competing research grants has shown a similar upward trend from 1982 to 1991 (see figure 3). However, the success rate for underrepresented minorities (as defined by the number of awards given as a percentage of the number of applications reviewed) has generally been lower than the overall success rate for research grant applicants, averaging 2.4 percentage points lower over the 10-year period.

Examining all RPG's, overall trend data for underrepresented minorities are shown in figures 4 through 6. Figure 4 shows that the total number of competing RPG awards to underrepresented minorities has remained relatively stable from FY 1982 to 1991, although the percentage of total awards has been slightly higher during the past 3 years. The average dollar size of competing research project grants awarded to underrepresented minorities, however, has been consistently higher than the overall average throughout the 10-year period (approximately \$8,000 higher), except for FY 1986 and FY 1991 (see figure 5). As shown in figure 6, the amount of funds awarded to underrepresented minorities for research project grants has increased each year since 1982, in keeping with the overall trend for NIH. The percentage of total RPG funds awarded to underrepresented minorities has remained remarkably stable at 2.3 percent during the past 7 years of this period, not increasing in recent years as was found for all competing NIH research grants awarded to underrepresented minorities.

To gain a better understanding of trends for underrepresented minorities with respect to specific types of competing awards, separate analyses were conducted for traditional research project (R01) awards, MERIT (R37) awards, New Investigator (R23) and FIRST (R29) awards, and Postdoctoral NRSA (F32) fellowships. Results are presented in figures 7 through 13.

Because R01's constitute a majority of research project grant awards, it is not surprising that underrepresented minorities were the recipients of more R01 grants than other competing awards. However, the proportion of R01 applications submitted by underrepresented minorities and the proportion of R01 grants awarded to these minority groups from FY 1982 to FY 1991 were both quite low (see figures 7 and 8).

Only 17 MERIT (R37) awards were given to underrepresented minority individuals from FY 1986 to 1991 (see figure 9),

perhaps because there are very few underrepresented minority individuals in the United States who have the qualifications to be nominated for the prestigious MERIT award-having been biomedical researchers for an extended period of time with adequate opportunity to demonstrate distinctly superior research competence and productivity.

Although there has been an upward trend in the percentage of New Investigator and FIRST awards, very few underrepresented minorities applied for and received R23 and R29 grants during the 10-year period (see figures 10 and 11). This research grant support mechanism (with R29 grants replacing R23 grants in 1986) is intended to support the first independent investigative efforts of an individual and to help effect a transition toward the traditional types of NIH research project grants. FIRST awards offer individuals who have recently completed research/training programs an excellent opportunity to obtain initial research support and enhance their biomedical research skills.

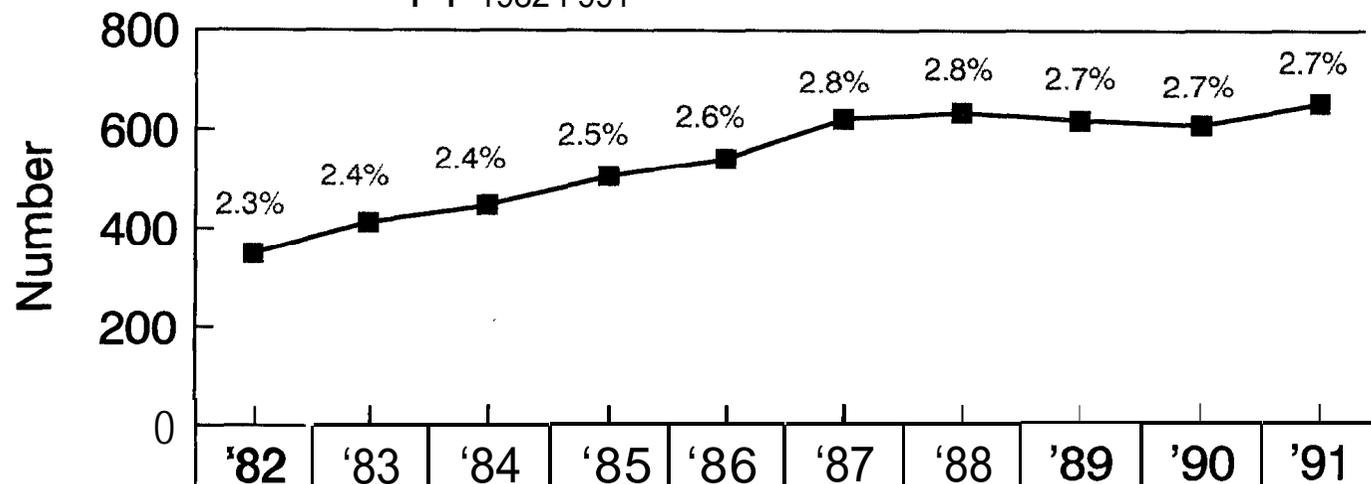
Similarly, relatively few underrepresented minority individuals applied for and received postdoctoral NRSA fellowships from FY 1982 to 1991, and the percentage of total F32 fellowships awarded to underrepresented minorities decreased in FY 1991, as did the percentage of minority F32 applications (see figures 12 and 13). These fellowships are awarded for 1 to 3 years to qualified individuals holding a doctoral or equivalent degree to support full-time research training in designated biomedical science areas. They are designed to enable individuals with recently awarded doctorates to broaden their scientific background and enhance their research skills in preparation for research careers in health-related areas.

It should be noted that this report does not include trend data on the number of underrepresented minority individuals who have received monetary support as trainees under NIH institutional training grants, such as T32 grants. A meaningful analysis of trainees was not possible because race/ethnicity was only recently added to the trainee appointment form (PHS Form 2271) in September 1991.

Taken together, the trend data for underrepresented minorities shown in figures 1 through 13 indicate that the various NIH research and fellowship programs appear to have had only a

modest effect on the number of underrepresented minorities who have applied for and/or received traditional nontargeted NIH extramural research grants and postdoctoral fellowships.

Figure 1
Competing and Noncompeting Research Grants
 (R, M, K, S, U, P, G12, D24 Grants)
Total Number and Percent* of Awards to
Underrepresented Minority Principal Investigators**
 FY 1982-1991



	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Native American	25	30	32	31	26	27	30	29	36	35
Hispanic	215	235	270	316	344	371	407	394	393	420
African American	113	152	150	164	176	228	202	201	185	203
Asian/Pacific Islander	1,064	1,194	1,295	1,441	1,529	1,650	1,673	1,679	1,667	1,754
White	14,160	15,769	17,110	18,238	18,842	20,135	20,592	20,619	20,355	21,546
Awards (race reported)	15,577	17,380	18,857	20,190	20,917	22,411	22,904	22,922	22,636	23,958
Awards (race not reported)	4,485	3,499	2,646	2,624	2,260	2,466	2,642	2,832	2,889	2,781
SBIRs (race not requested)	0	123	249	344	445	465	477	556	609	670
Total awards	20,062	21,002	21,752	23,158	23,622	25,342	26,023	26,310	26,134	27,409
Awards to underrep'd minorities +	353	417	452	511	546	626	639	624	614	658

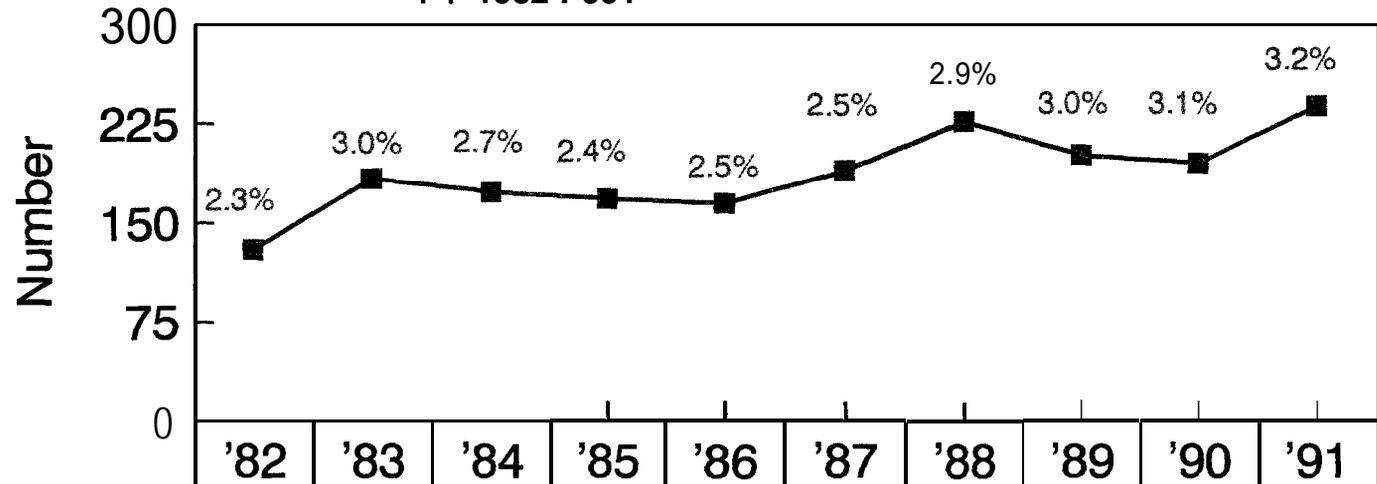
* Percent of total awards is based on awards where race/ethnicity is available.

**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Note: Race is not requested for small business SBIR (R43/R44) grants.

Data source: IMPAC.

Figure 2
Competing NIH Research Grants
(R, M, K, S, U, P, G12, D42 Grants)
Number and Percent* of Awards to
Underrepresented Minority Principal Investigators**
FY 1982-I 991



	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Native American	1	10	4	2	3	3	7	13	19	16
Hispanic	85	94	104	106	107	106	132	112	104	127
African American	45	81	67	62	57	83	90	79	75	98
Asian/Pacific Islander	388	436	462	551	497	573	536	440	436	533
White	5,152	5,452	5,805	6,355	6,023	6,877	7,009	6,119	5,661	6,808
Awards (race reported)	5,671	6,073	6,442	7,076	6,687	7,642	7,774	6,763	6,295	7,582
Awards (race not reported)	239	259	289	294	391	555	923	942	934	919
SBIRs (race not requested)	0	123	246	301	393	387	388	451	504	556
Total awards	5,910	6,455	6,977	7,671	7,471	8,584	9,085	8,156	7,733	9,057
Awards to underrep'd minorities ■	131	185	175	170	167	192	229	204	198	241

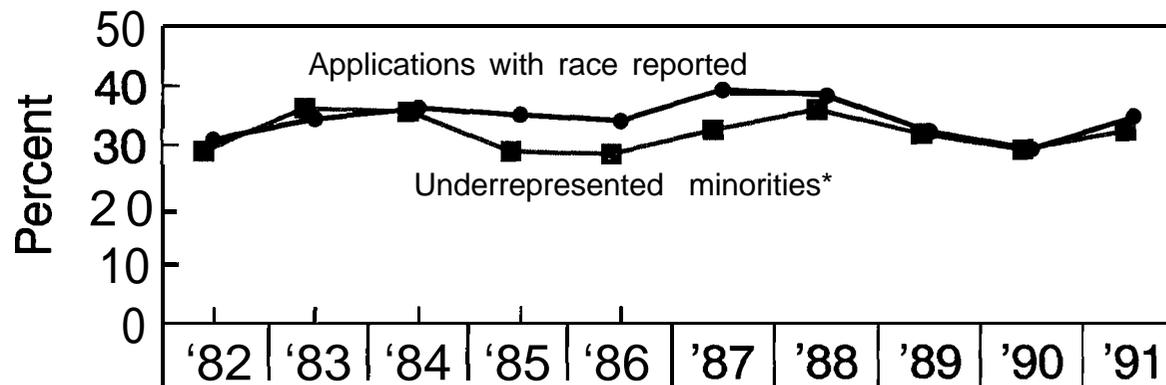
* Percent of total awards is based on awards where race/ethnicity is available.

**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Note: Race is not requested for small business SBIR (R 43/R 44) grants.

Data source: IMPAC.

Figure 3
Competing NIH Research Grant Applications
 (R, M, K, S, U, P, G12, D42, Grants)
Success Rates of Applications from
Underrepresented Minority* Principal Investigators
 FY 1982-1991



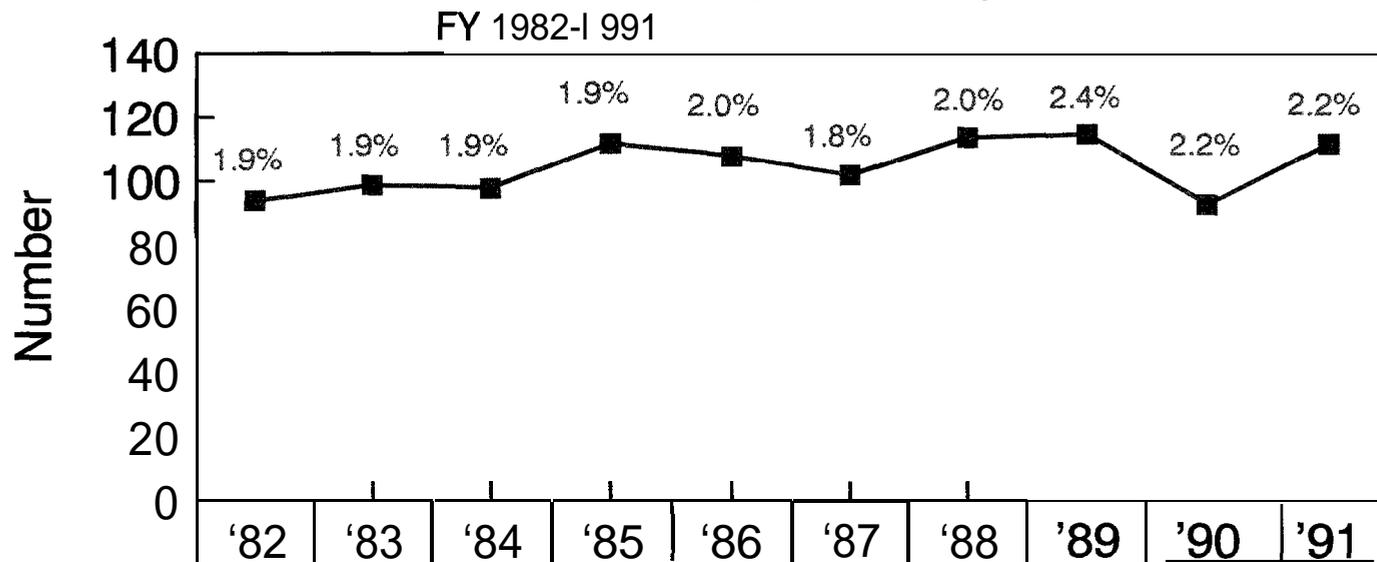
	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Applications (race reported)	18,199	17,560	17,732	20,145	19,624	19,394	20,348	20,962	21,481	21,763
Applications (race not reported)	963	996	804	909	1,007	1,100	1,611	1,599	1,636	1,488
SBIRs (race not requested)	0	598	785	855	1,669	1,531	1,693	1,808	1,925	1,921
Applications from underrep'd minorities	442	507	485	583	581	586	639	641	683	75c
Total applications	19,162	19,154	19,321	21,909	22,300	22,025	23,652	24,369	25,042	25,172
Awards (race reported)	5,671	6,073	6,442	7,076	6,687	7,642	7,774	6,763	6,295	7,582
Awards (race not reported)	239	259	289	294	391	555	923	942	934	919
SBIRs (race not requested)	0	123	246	301	393	387	388	451	504	55E
Awards to underrep'd minorities	131	185	175	170	167	192	229	204	198	241
Total awards	5,910	6,455	6,977	7,671	7,471	8,584	9,085	8,156	7,733	9,057
Success rate of applications (race reported) ●	31.0%	34.4%	36.2%	35.0%	34.0%	39.2%	38.1%	32.1%	29.2%	34.6%
Success rate of underrep'd minorities ■	29.5%	36.5%	35.9%	29.1%	28.6%	32.5%	35.7%	31.6%	28.9%	31.9%

*"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Note: Race is not requested for small business **SBIR (R43/R44)** grants.

Data source: IMPAC.

Figure 4
Competing NIH Research Project Grants
 (R01, R22, R23, R29, R35, R37, P01, U01 Grants)
 Number and Percent* of Awards to
 Underrepresented Minority** Principal Investigators



	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Native American	1	2	4	2	2	1	5	9	12	10
Hispanic	70	68	72	83	84	75	82	85	62	77
African American	23	29	22	27	22	26	27	21	19	25
Asian/Pacific Islander	351	382	387	464	422	481	432	362	317	407
White	4,413	4,611	4,575	5,189	4,994	5,237	5,015	4,259	3,734	4,521
Awards (race reported)	4,858	5,092	5,060	5,765	5,524	5,820	5,561	4,736	4,144	5,040
Awards (race not reported)	169	180	199	194	250	265	276	213	198	177
Total awards	5,027	5,272	5,259	5,959	5,774	6,085	5,837	4,949	4,342	5,217
Awards to underrep'd minorities	94	99	98	112	108	102	114	115	93	112

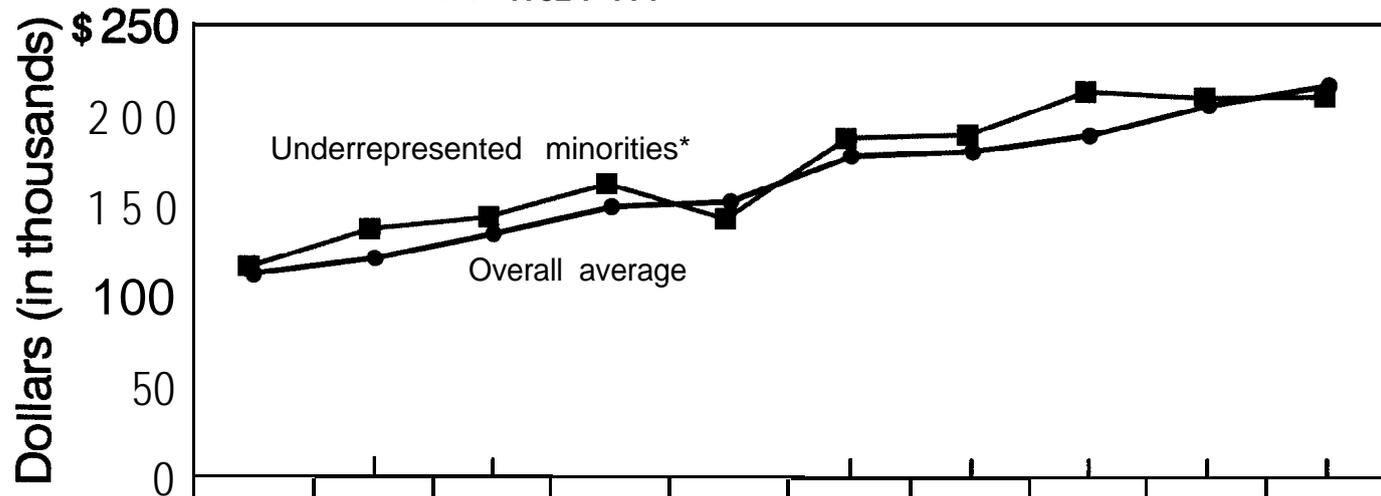
*Percent of total awards is based on awards where race/ethnicity is reported.

**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Note: Race is not requested for small business SBIR (R43/R44) grants.

Data source: IMPAC.

Figure 5
 Competing NIH Research Project Grants
 (R01 , R22, R23, R29, R35, R37, P01,U01 Grants)
 Average Dollar Size of Awards to
 Underrepresented Minority* Principal Investigators
 FY 1982-1 991



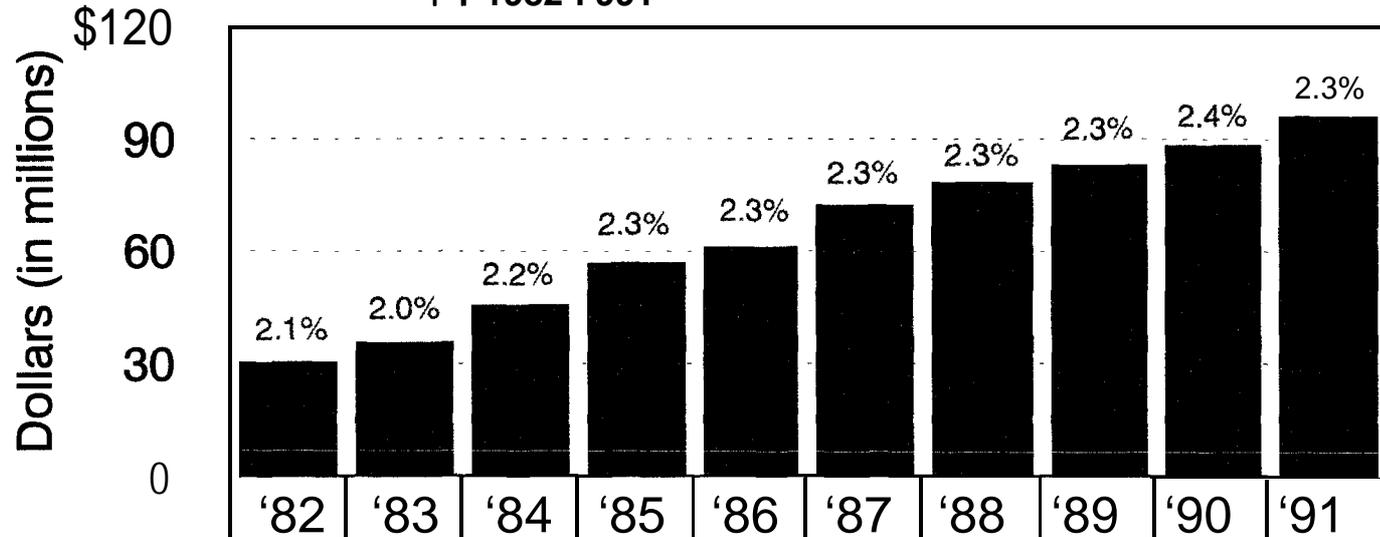
	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Native American	510	119	104	355	110	170	229	201	271	157
Hispanic	118	162	154	154	140	202	202	220	187	226
African American	100	84	123	178	164	153	151	204	257	196
Asian/Pacific Islander	96	102	118	125	128	158	158	159	182	197
White	113	122	136	152	156	181	184	192	208	222
Average (race reported)	112	121	135	150	154	179	182	190	206	220
Average (race not reported)	125	130	152	159	153	176	168	195	248	189
Overall average ●	112	121	135	150	153	179	182	191	208	219
Awards to underrep'd minorities ■	117	138	145	163	144	189	191	215	212	213

*"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.
 Note: Race is not requested for small business SBIR (R43/R44) grants.

Data source: IMPAC.

Figure 6

Competing and Noncompeting NIH Research Project Grants
 (R01, R22, R23, R29, R35, R37, P01, U01 Grants)
 Total Amount and Percent* of Support to
 Underrepresented Minority** Principal Investigators
 FY 1982-I 991



Native American	1.8	2.2	2.6	2.9	3.3	3.9	4.9	5.4	6.7	7.4
Hispanic	25.1	28.3	36.6	45.1	48.2	56.5	60.8	65.4	67.3	73.0
African American	5.0	6.7	7.9	10.4	11.0	13.2	14.0	13.5	15.4	16.8
Asian/Pacific Islander	91.3	111.2	135.5	160.5	173.0	209.9	221.4	237.7	250.3	277.8
White	1,395.3	1,678.1	1,980.6	2,294.3	2,456.1	2,928.6	3,145.0	3,365.1	3,467.8	3,767.8
Funds awarded (race reported)	1,518.5	1,826.5	2,163.2	2,513.1	2,691.6	3,212.0	3,446.3	3,687.2	3,807.6	4,142.8
Funds awarded (race not reported)	315.9	265.7	221.7	240.7	194.8	226.7	264.2	312.5	333.5	329.2
Total funds awards*	1,834.4	2,092.3	2,384.9	2,753.8	2,886.4	3,438.7	3,710.5	3,999.7	4,141.1	4,472.0
Awards to underrep'd minorities ■	32.0	37.2	47.0	58.4	62.5	73.5	79.8	84.3	89.5	97.2

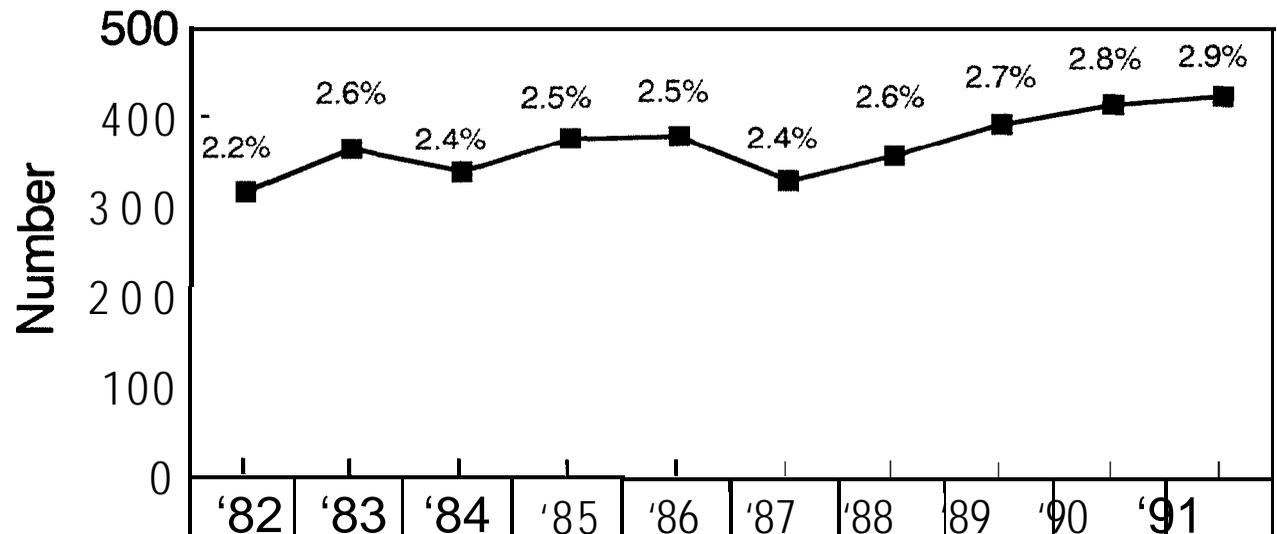
*Percent of total awards is based on awards where race/ethnicity is reported.

**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Note: Race is not requested for small business SBIR (R43/R44) grants.

Data source: IMPAC.

Figure 7
Traditional Research (R01 Grants) Grants
Number and Percent* of Competing Applications from
Underrepresented Minority Principal Investigators**
FY 1982-I 991



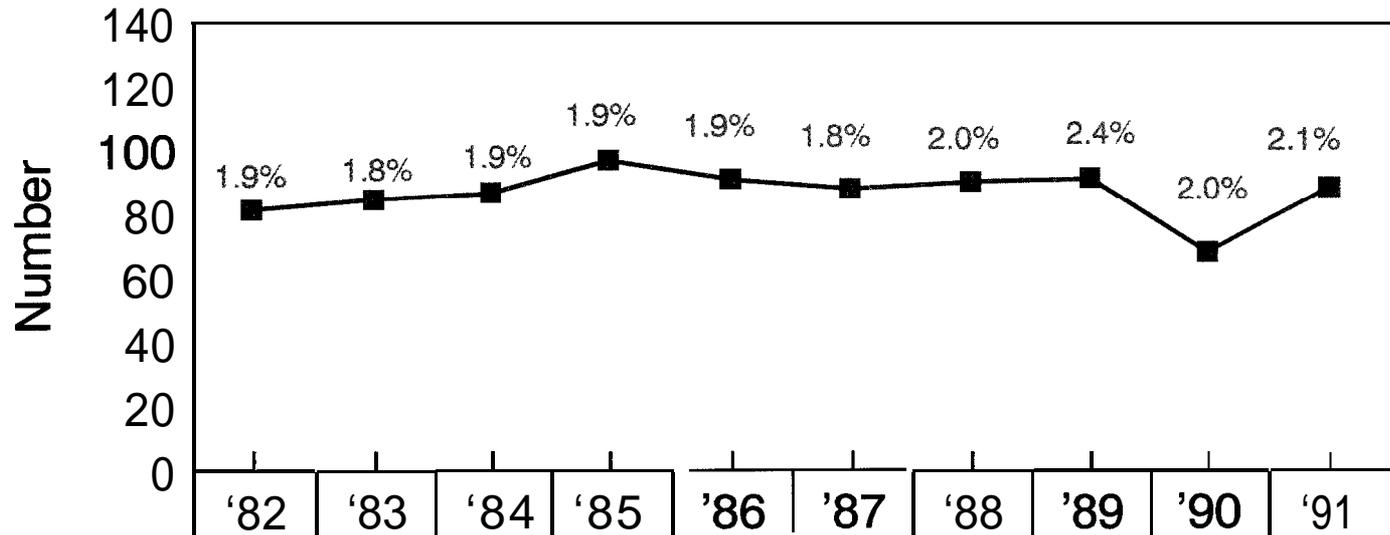
	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Native American	7	12	15	13	13	10	13	23	33	44
Hispanic	199	238	224	240	247	217	224	260	245	249
African American	112	115	101	124	120	104	122	111	138	132
Asian/Pacific Islander	1,337	1,289	1,301	1,420	1,409	1,322	1,346	1,396	1,456	1,449
White	113,008	12,571	12,291	13,552	13,121	11,971	12,316	12,869	13,239	12,729
Applications (race reported)	114,663	14,255	13,932	15,349	14,910	13,624	14,021	14,659	15,111	14,603
Applications (race not reported)	713	669	552	593	590	489	571	532	541	444
Total applications	115,376	14,894	14,484	15,942	15,500	14,113	14,592	15,191	15,652	15,047
Applications from underrep'd minorities ■	318	365	340	377	380	331	359	394	416	425

* Percent of total applications is based on applications where race/ethnicity is reported.

**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Data source: IMPAC.

Figure 8
Traditional Research Project (R01) Grants
Number and Percent* of Competing Awards to
Underrepresented Minority Principal Investigators**
FY 1982-1991



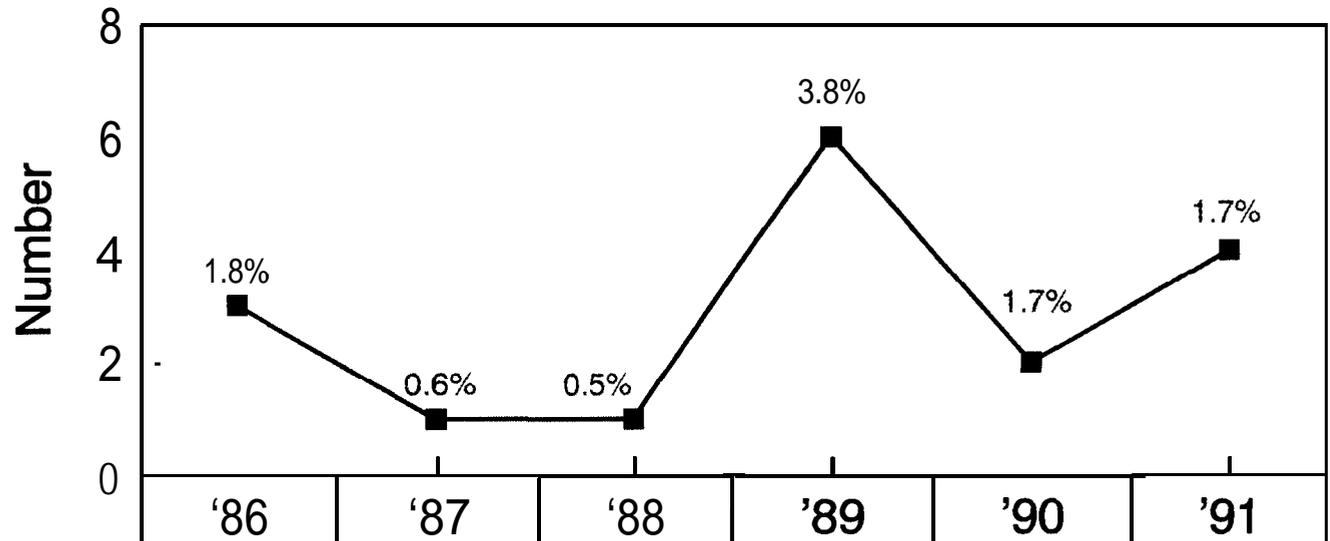
	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Native American	0	2	4	1	2	1	4	6	7	8
Hispanic	63	58	63	71	71	67	67	69	50	59
African American	18	24	19	24	17	19	18	15	10	20
Asian/Pacific Islander	319	351	352	425	377	412	363	294	261	336
White	3,932	4,132	4,075	4,532	4,260	4,340	4,035	3,445	3,035	3,628
Awards (race reported)	4,332	4,567	4,513	5,053	4,727	4,839	4,487	3,829	3,363	4,051
Awards (race not reported)	152	161	176	160	204	179	175	142	128	123
Total awards	4,484	4,728	4,689	5,213	4,931	5,018	4,662	3,971	3,491	4,174
Awards to underrep'd minorities ■	81	84	86	96	90	87	89	90	67	87

* Percent of total awards is based on awards where race/ethnicity is reported.

**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Data source: IMPAC.

Figure 9
Merit (R37) Grants
 Number and Percent* of Competing Awards to
 Underrepresented Minority** Principal Investigators
 FY 1986-1991



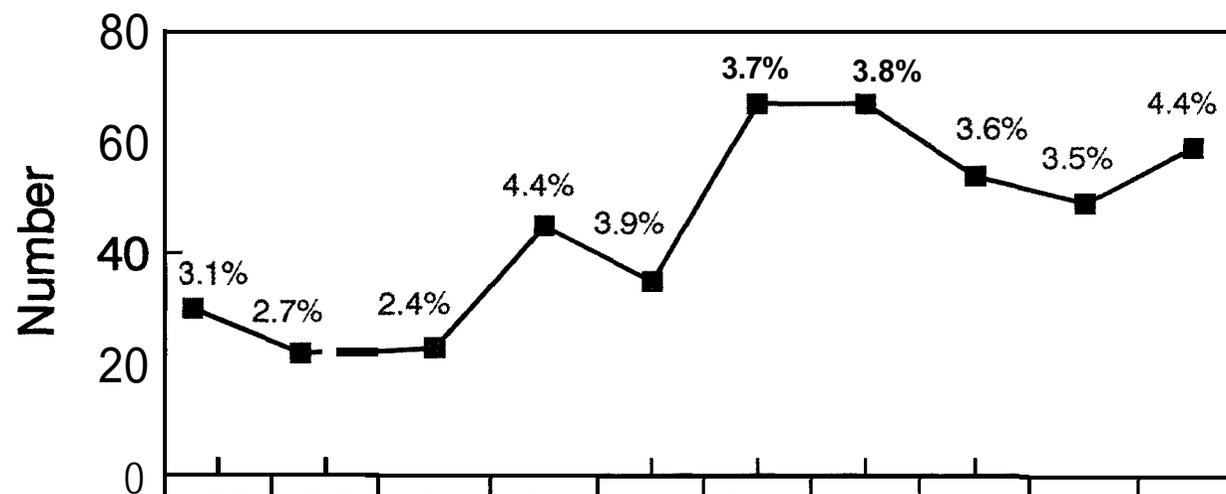
	'86	'87	'88	'89	'90	'91
Native American	0	0	0	1	1	1
Hispanic	3	1	1	5	1	3
African American	0	0	0	0	0	0
Asian/Pacific Islander	11	9	10	8	10	17
White	149	161	178	142	105	214
Awards (race reported)	163	171	189	156	117	235
Awards (race not reported)	5	8	0	5	1	4
Total awards	168	179	189	161	118	239
Awards to underrep'd minorities ■	3	1	1	6	2	4

* Percent of total awards is based on awards where race/ethnicity is reported.

**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Data source: IMPAC.

Figure 10
New Investigator (R23) and FIRST (R29) Grants
Number and Percent* of Competing Applications from
Underrepresented Minority Principal Investigators**
FY 1982-1 991



	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Native American	0	0	1	0	0	1	0	2	0	5
Hispanic	13	9	8	19	15	28	32	29	28	35
African American	17	13	14	26	20	38	35	23	21	19
Asian/Pacific Islander	95	69	84	97	91	199	207	172	161	144
White	842	714	843	881	782	1,544	1,478	1,266	1,210	1,140
Applications (race reported)	967	805	950	1,023	908	1,810	1,752	1,492	1,420	1,343
Applications (race not reported)	34	65	49	53	65	162	184	131	116	102
Total applications	1,001	870	999	1,076	973	1,972	1,936	1,623	1,536	1,445
Applications from underrep'd minorities ■	30	22	23	45	35	67	67	54	49	59

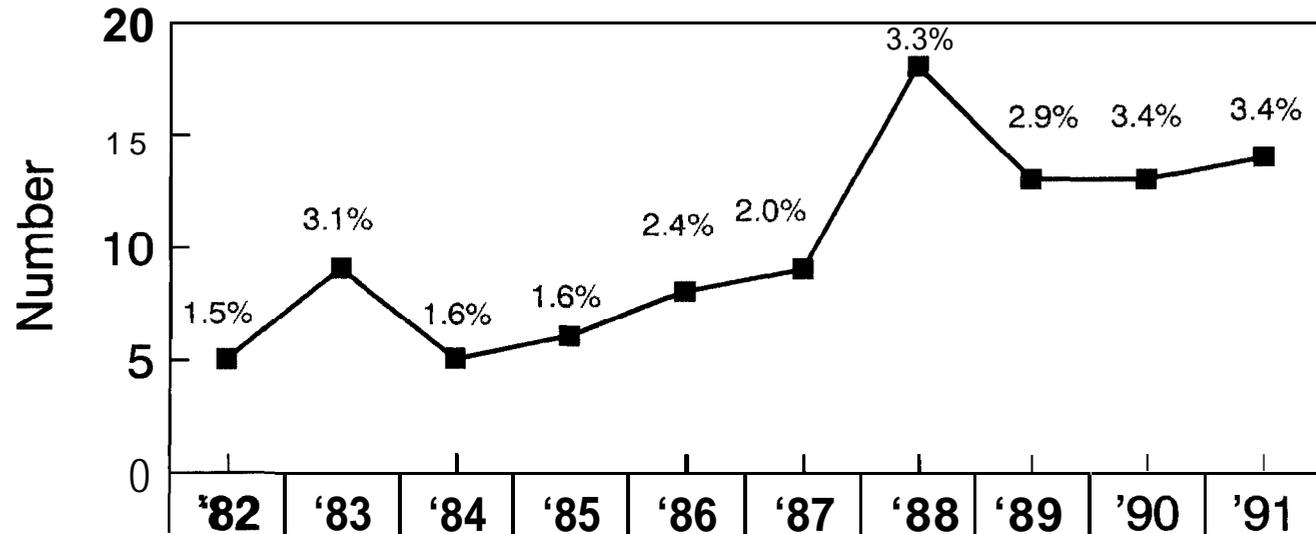
* Percent of total applications is based on applications where race/ethnicity is reported.

**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Note: New investigator (R23) awards were replaced by FIRST (R29) awards in 1986.

Figure 11

New Investigator (R23) and FIRST (R29) Grants
 Number and Percent* of Competing Awards to
 Underrepresented Minority** Principal Investigators
 FY 1982- 1991



	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Native American	0	0	0	0	0	0	0	1	0	1
Hispanic	1	4	2	4	5	3	9	8	8	9
African American	4	5	3	2	3	6	9	4	5	4
Asian/Pacific Islander	25	26	26	32	26	43	50	47	34	40
White	294	260	287	337	295	401	485	392	337	357
Awards (race reported)	324	295	318	375	329	453	553	452	384	411
Awards (race not reported)	10	16	12	19	24	56	74	52	41	39
Total awards	334	311	330	394	353	509	627	504	425	450
Awards from underrep'd minorities ■	5	9	5	6	8	9	18	13	13	14

* Percent of total awards is based on awards where race/ethnicity is reported.

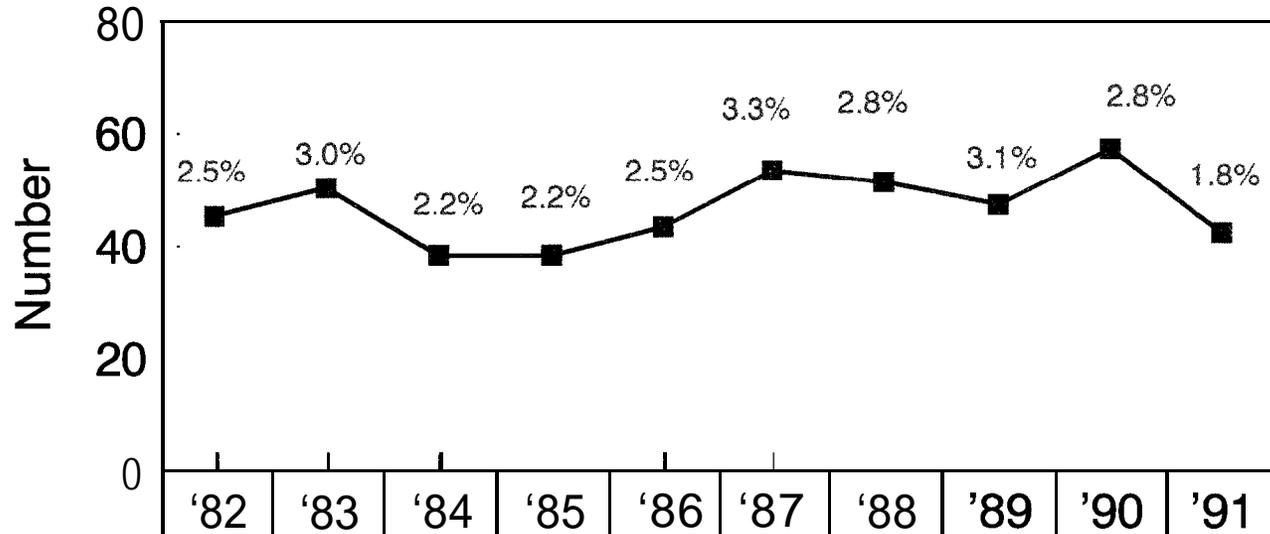
**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Note: New Investigator (R23) awards were replaced by FIRST (R29) awards in 1986.

Data source: IMPAC.

Figure 12

Postdoctoral National Research Service Award (F32) Fellowships
 Number and Percent* of Competing Applications from
 Underrepresented Minority** Principal Investigators
 FY1 982-1 991



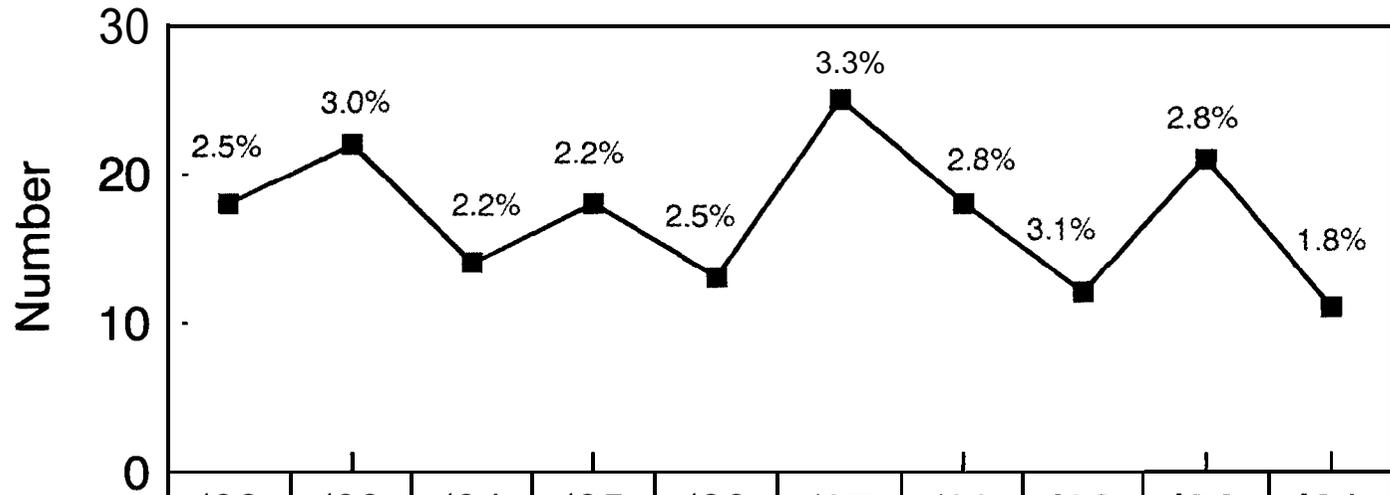
	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Native American	0	2	1	2	1	0	1	1	6	3
Hispanic	20	22	26	22	24	28	31	35	35	26
African American	25	26	11	14	18	25	19	11	16	13
Asian/Pacific islander	89	77	83	91	116	88	96	74	123	116
White	1,573	1,500	1,571	1,714	1,734	1,510	1,425	1,254	1,541	1,395
Applications (race reported)	1,707	1,627	1,692	1,843	1,893	1,651	1,572	1,375	1,721	1,553
Applications (race not reported)	141	151	156	233	161	239	305	828	124	144
Total application:	1,848	1,778	1,848	2,076	2,054	1,890	1,877	2,203	1,845	1,697
Applications from underrep'd minorities	45	50	38	38	43	53	51	47	57	42

* Percent of total applications is based on applications where race/ethnicity is reported.

**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Data source: IMPAC.

Figure 13
 Postdoctoral National Research Service Award (F32) Fellowships
 Number and Percent* of Competing Awards from
 Underrepresented Minority** Principal Investigators
 FY1 982-1 991



	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Native American	0	0	0	2	0	0	0	0	3	0
Hispanic	7	11	10	9	5	15	11	11	14	8
African American	11	11	4	7	8	10	7	1	4	3
Asian/Pacific islander	41	27	24	32	23	32	34	17	46	38
White	668	679	612	760	490	702	584	353	674	578
Awards (race reported)	727	728	650	810	526	759	636	382	741	627
Awards (race not reported)	50	64	55	118	48	123	160	249	53	103
Total awards	777	792	705	928	574	882	796	631	794	730
Awards to underrep'd minorities	18	22	14	18	13	25	18	12	21	11

* Percent of total awards is based on awards where race/ethnicity is reported.

**"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Data source: IMPAC.

SECTION 3:

NIH MINORITY RESEARCH/TRAINING SUPPORT PROGRAMS

Descriptions of each of the major NIH minority research/training programs are presented in this section of the report, including data on the number of individuals who have been supported by each of the programs and the overall levels of support provided, showing trends through time as well as available outcome data. In addition, several smaller Institute-specific minority research/training programs are described.

MINORITY BIOMEDICAL RESEARCH SUPPORT (MBRS) PROGRAM

The MBRS Program was established 20 years ago to strengthen institutional research capabilities and provide for faculty and student participation in research at 4-year public and private nonprofit colleges, universities, and health professional schools with substantial minority enrollments. Support has been similarly provided to a few 2-year community colleges. Initially called the Minority Biomedical Support Program, the first awards were made in 1972. MBRS schools must have either 50 percent or more minority student enrollment or, if the minority student population is significant but less than 50 percent, a demonstrated commitment to the special encouragement and assistance of minority students and faculty.

The MBRS Program provides research program awards to eligible institutions. Each annual award may range from \$50,000 to \$1.5 million to support 2 to 25 faculty research projects, under the coordination of a program director, that involve the investigation of diverse scientific problems in a broad range of biomedical and related scientific fields. Faculty members who receive MBRS grant support for their individual research projects are expected to submit the results for publication in peer-reviewed scientific journals, to make presentations of their research at scientific meetings, and to try to obtain other support for their research. Also, the program expects grantees to involve underrepresented minority undergraduate and graduate students as active paid research

assistants on individual faculty research projects. These students are then encouraged to attend and make presentations at scientific meetings and to co-author publications, in the hope that such research experiences will stimulate them to pursue careers in biomedical research.

In 1990, the administration of the MBRS Program was transferred from the Division of Research Resources (DRR), which had administered the program for 18 years, to the National Institute of General Medical Sciences (NIGMS). A cofunding mechanism enables other NIH components to help support MBRS research projects of direct relevance to their missions. Fourteen NIH components presently cofund MBRS projects, including the three Institutes recently transferred to the NIH as a result of the reorganization of the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA). Project review and program and fiscal management reside within the NIGMS.

The MBRS Program currently has two primary grant mechanisms for carrying out its objectives:

1. The Traditional MBRS Program (SO6 research-related grants).
2. The MBRS Program for Undergraduate Colleges (S14 research-related grants).

TRADITIONAL MBRS PROGRAM

This program primarily supports biomedical research projects, with an added emphasis on promoting the involvement of undergraduate and graduate students and enhancing the overall research capability of the grantee institution. These 4-year awards provide support for faculty research projects and include salaries and benefits for students who are selected by the grantee institutions to participate as research assistants in the faculty members' research. Funds are also provided for research equipment and supplies, travel to scientific meetings, technical support, and in some cases, the development of institutional infrastructure. Part-time salaries for the program director and faculty investigators are provided. At least two faculty members with different research projects must be involved for an institution to be eligible for the traditional MBRS grant. Eligible schools range from 2-year community colleges to institutions that offer graduate or health professional degrees.

A mechanism exists within the traditional MBRS grant to support opportunities for minority students to participate in non-MBRS biomedical research grants under the supervision of an established investigator (called an MBRS associate investigator). Funds are provided for student salaries, benefits, and research supplies, as well as for administrative costs. This arrangement most commonly occurs at eligible institutions that are traditionally majority institutions that grant doctorate degrees and have significant biomedical research capability.

MBRS PROGRAM FOR
UNDERGRADUATE
COLLEGES

This program supports enrichment activities, pilot research projects, and regular research projects of faculty members at undergraduate institutions. Enrichment activities, which are a required component of this type of grant, may include workshops, attendance at scientific meetings, and summer research experiences for faculty and students at off-campus laboratories. At least two faculty members at an institution must be involved in these activities. The maximum amount that can be awarded is \$450,000 in direct costs for a 3-year period (approximately \$150,000 per year), plus applicable indirect costs.

Taken together, the number of institutional MBRS awards to support these two programs increased from 38 to 75 during the first 5 years of the program (FY 1972 through 1976), leveled off for several years, increased again during the mid-1980's, and has shown a slight decrease since 1987 (see figure 14). At its peak in 1987, SO6 and S14 grants were awarded to 103 different institutions throughout the United States. MBRS funding has followed a similar pattern, with only moderate increases since 1985, using dollar figures unadjusted for inflation (see figure 15). In FY 1991, MBRS-supported institutions received a total of \$42.6 million from the NIH to provide faculty members and underrepresented minority undergraduate and graduate students an opportunity to pursue biomedical research projects and to enhance the overall research capability of the institution.

The number of faculty and students supported by MBRS has increased considerably over the past 20 years, leveling off in recent years (see figure 16). Since 1984, more than 1,000 undergraduate student research positions have been supported by MBRS each year. In addition, an average of over 400 graduate positions and over 750 faculty members have received MBRS support annually since 1984. Since its

inception in 1972 through 1991, a cumulative total of approximately 1,600 faculty members have received support for their research projects, and approximately 16,500 undergraduate and graduate students have received some MBRS support. Information is not available on the proportional distribution of racial/ethnic groups among these faculty members and students, but they are known to be predominantly minority groups that are underrepresented in biomedical science. Equally important, information is not currently available on the accomplishments of funded faculty members, including their scientific publications.

A key outcome measure for evaluating the program's success is the number of MBRS-supported students, particularly underrepresented minorities, who have received Ph.D. degrees in the biomedical sciences. Although it has been very difficult to track these students through time, periodic evaluations have been conducted (see Section 5). Specifically, the DRR during its administration of the MBRS Program, and the NIGMS, which has administered the program since 1990, have conducted analyses to identify as many MBRS-supported students as possible who went on to receive advanced degrees. To help collect outcome data, the DRR and the NIGMS have worked with several organizations external to the NIH, including the Association of American Medical Colleges (AAMC), the American Dental Association, the NRC, and the National Science Foundation. Results from a recent analysis matching 15,503 MBRS students with the Doctorate Records File (DRF) maintained by the NRC are presented in figure 17. The analysis showed that a cumulative total of at least 304 MBRS-supported students had received Ph.D.'s in the biological sciences during the period June 1975 through June 1989, including 89 Hispanics and 167 African-Americans who are U.S. citizens. Eighteen other former MBRS students were found in the DRF, nine of whom were not U.S. citizens and nine others who received Ph.D.'s prior to 1975 when race/ethnicity was not captured in the DRF. A previous study, conducted in 1987 by the DRR, found that of the 13,151 students supported by MBRS from 1972 through 1986, 773 had received M.D. degrees, and 51 had received D.D.S. degrees by 1987. These results may underrepresent the actual number of doctoral degrees received by MBRS-supported students because complete data on educational outcomes for these minority students are not available at this time.

The NIGMS has been actively pursuing ways to overcome these difficulties and develop a database information system that will permit better monitoring of the accomplishments of the MBRS Program; including the career outcomes of program participants. In keeping with this objective, an ad hoc MBRS Advisory Group convened by the NIGMS in 1992 urged the reviewers of competing MBRS applications to carefully examine and give consideration to the number of MBRS students who have entered advanced research training, earned doctorate degrees, and are pursuing research careers (see Section 5). The advisory group emphasized that accurate and complete data are urgently needed to demonstrate the impact of this intended goal of the program, as well as to assess the accomplishments of faculty members who have received MBRS support for research projects.

MINORITY ACCESS TO RESEARCH CAREERS (MARC) PROGRAM

To help elicit the talent of members of minority groups that had long been underrepresented in the biomedical sciences, the NIGMS established the MARC Program in 1972. Three years later, it was formally recognized as an NIH extramural grants program. The MARC Program, under the administration of the NIGMS, supports biomedical research training for students and faculty members at 4-year colleges, universities, and health professional schools in which substantial student enrollments are drawn from underrepresented minority groups.

The impetus to develop the MARC Program came at the end of the 1960's, in response to an increasing demand for minority scientists by academic institutions, industry, and government and in recognition that an extremely low proportion of the Nation's biomedical scientists were members of minority groups. In 1972, the first two MARC components—the Faculty Fellowship and the Visiting Scientist Program—were initiated. The MARC Honors Undergraduate Research Training Program was subsequently established in 1977, and the MARC Predoctoral Fellowship Program was initiated in 1981.

MARC enables grantee institutions to develop and strengthen their biomedical research training capabilities through improved science curricula, seminars, off-campus research

experiences, and other special activities. As a result, these institutions are better able to increase the number of underrepresented minority students who receive degrees in biomedical science and go on to graduate school, subsequently pursuing biomedical research careers. The program also provides competitive fellowships to faculty members at MARC schools who wish to obtain graduate degrees and advanced training in biomedically related research at major universities and laboratories outside their home institutions. In addition, the MARC Program offers support for grantee institutions to invite visiting scientists to spend periods of time on their campuses to participate in research/training activities and help strengthen the institutions' biomedical sciences programs.

The total amount of support for MARC training grants has continued to increase over the past decade, with MARC-supported institutions receiving \$11.4 million from the NIH in FY 1991 to provide training to undergraduate students. The total amount of support for MARC fellowships has also increased; \$1.8 million was awarded in FY 1991 to predoctoral students, faculty members, and visiting scientists (see figure 18). Taken together, the total amount of support for the MARC Program was \$13.2 in FY 1991.

A total of 53 of the 67 MARC schools currently funded also have MBRS Programs or are affiliated with institutions having MBRS Programs. One distinction between the two programs is that MARC undergraduate students participate as MARC trainees supported by T34 training grants, whereas MBRS undergraduate and graduate students participate as paid research assistants on faculty research projects.

The MARC Program currently has three primary mechanisms for carrying out its objectives:

1. MARC Honors Undergraduate Research Training Program (T34 training grants).
2. MARC Predoctoral Fellowships (one type of F31 fellowship).
3. MARC Faculty Fellowships (F34 fellowships).

In addition to these three primary components, the MARC Program includes the MARC Visiting Scientist Program (F36 fellowships) which is described in this section.

**MARC HONORS
UNDERGRADUATE
RESEARCH TRAINING
PROGRAM**

The MARC Honors Undergraduate Research Training Program, also referred to as the MARC Honors Program, was established in 1977 to assist minority institutions in developing strong undergraduate biological sciences curricula, stimulating undergraduates' interest in biomedical research, and increasing the number of well-prepared minority students who can compete successfully for entry into graduate programs leading to the Ph.D. degree or the combined M.D./Ph.D. degree in the biomedical sciences. Under this program, highly qualified eligible institutions receive T34 training grant support to develop undergraduate science curricula and provide biomedical research training for honors students. These institutions select students on the basis of both their academic achievements and their strong intention to subsequently obtain the doctoral degree in an area of biomedical science. The MARC Honors Program originally funded only juniors and seniors but was expanded in 1991 to include 57 freshmen and sophomores as well. Grants cover a stipend of \$4,800 per year for freshman and sophomore trainees and a stipend of \$6,732 per year for junior and senior trainees, as well as full tuition, fees, and trainee-related expenses. Although T34 training grants are one type of NRSA, MARC Honors undergraduates are specifically exempt from the NRSA payback requirements.

Most MARC Honors undergraduates participate in at least one summer research project at a major research institution. This off-campus research experience, a valuable part of the program, enables students to broaden their research activities, co-author scientific papers, and receive invitations to present their work at scientific meetings. The summer experience also allows trainees to demonstrate their competence to the established scientists of the research institutions that may then recruit them as graduate students or provide letters of recommendation.

As shown in figure 19, the number of institutions receiving support for MARC Honors programs has increased from 12 in 1977 to 63 in 1991, with a few new institutions being funded each year. The number of undergraduate students supported by the MARC Honors Program has also increased over the past 15 years, with more than 400 students being supported

each year since 1984 (see figure 20). Since its inception in 1977 through 1991, a cumulative total of at least 3,312 undergraduate students have received MARC training grant support.

MARC training grants are made to institutions with “substantial underrepresented minority student populations,” and the institutions are responsible for selecting the trainees from among their student applications. The race/ethnicity of MARC Honors Program trainees was not collected or reported to the NIH on trainee appointment forms until September 1991, so there is little information currently available on the racial/ethnic distribution of MARC trainees (see Section 4). Perhaps more important, no mechanism is currently in place to track trainees after they leave the MARC Honors Program. Both of these problems are well understood and are currently being addressed by staff of the NIGMS.

A retrospective evaluation of the MARC Honors Undergraduate Research Training Program was conducted by the NRC’s Institute of Medicine (IOM) in 1985. The study provided descriptive information on the MARC Honors Program and its trainees and graduates, on minority participation in biomedical science, and analyses of career progress of MARC graduates. The survey of former MARC trainees revealed that the racial/ethnic composition of 534 respondents was 64 percent African-American, 22 percent Hispanic, 5 percent Native American, and 6 percent Asian. The IOM report indicated that the MARC Honors Program has been very successful in providing research training opportunities for underrepresented minorities. Additional conclusions of the IOM evaluation are presented in Section 5.

Although current NIH data collection procedures were not designed to track MARC-supported undergraduate students prospectively through time, a 1991 study was conducted by the NIGMS to identify MARC-supported students who later received Ph.D. degrees. The analysis involved matching 2,752 former MARC undergraduate students who received support for 1 to 2 years during the period 1977 through 1990 with the Doctorate Records File maintained by the NRC. Results of the study, presented in figure 21, showed that a cumulative total of 54 MARC-supported trainees had received Ph.D.’s by the end of 1990, including 22 Hispanics and 23 African-Americans. Results showed that these Ph.D. recipients were all from the cohort of 1,264 MARC students supported from 1977 through

1984. No MARC undergraduates supported from 1985 through 1990 were recorded as having received the Ph.D. degree at the time the study was conducted, a finding that is not surprising given the fact that the median time from receipt of a bachelor's degree to receipt of a Ph.D. degree in the life sciences was 9 years for all students in 1990³ and is approximately 6 years for graduate students supported on NIH training grants. As with the MBRS findings, however, the results of the 1991 NIGMS study may underrepresent the actual number of Ph.D. degrees received by MARC-supported students because complete data on educational outcomes for these minority students are not available at this time.

The NIGMS has been actively pursuing ways to overcome these difficulties and develop a database information system that will permit better monitoring of the accomplishments of all of the MARC programs, including the career outcomes of students who have been program participants. With respect to the MARC Honors Program, the NIGMS has taken additional steps to address the need for evaluation studies, a need which was emphasized in the NRC's 1989 report on NRSA training programs.² The NRC concluded that gaps remain in our understanding of the institutions and trainees participating in the MARC Honors Program, as well as in our understanding of the selection of trainees and program outcomes.

To address these gaps, the NIGMS recently received approval to implement a comprehensive evaluation of the MARC Honors Program using DHHS 1 percent evaluation set-aside funds. The project will establish a database on the MARC Honors Program and its trainees and generate information that can be used to evaluate the degree to which the intended goals of the MARC undergraduate program are being met. Information will be collected on the programs implemented at MARC institutions, the trainees, the training experience, and former trainees' subsequent education and career paths. A more detailed description of the evaluation study is presented in Section 5.

MARC PREDOCTORAL FELLOWSHIPS

The MARC Predoctoral Fellowship Program, established in 1981, is designed to provide an incentive to underrepresented minorities to obtain research training in the Nation's very best graduate programs. MARC Predoctoral Fellowship awards (a type of F31 fellowship that is restricted to students who have been supported as MARC Honors Program trainees) are

conditional upon acceptance of the student into an approved doctoral degree (Ph.D.) or combined-degree (M.D. /Ph.D.) program in the biomedical sciences. Support is not available for individuals enrolled in medical or other professional schools unless they are enrolled in a combined-degree program. Support also is not available for students seeking only a master's degree. The current annual stipend for MARC predoctoral fellows is \$8,800. The award also includes tuition and fees and an allowance of \$2,000 to help defray the cost of supplies and permit travel to scientific meetings. MARC Predoctoral Fellowships may be awarded for up to 5 years. Awardees are subject to the NRSA payback provisions that require the awardee to subsequently engage in 1 year of research and/or teaching for each year of support received beyond the initial year. Second, this requirement provides a mechanism to help track awardees after their period of NIH support has ended.

The number of students receiving support from the MARC Predoctoral Fellowship Program has increased rather steadily since the inception of the fellowship program in 1981. From 1981 to 1991, a cumulative total of 163 predoctoral students received traditional MARC Predoctoral Fellowship awards (see figure 22).

MARC FACULTY FELLOWSHIPS

The MARC Faculty Fellowship Program, which was initiated in 1972, provides opportunities for advanced research training to selected full-time faculty members of 4-year colleges, universities, and health professional schools with substantial minority enrollments. These institutions may nominate faculty members for MARC fellowships to support advanced study at graduate departments and laboratories in any nonprofit public or private institution in the United States with suitable facilities. Faculty fellows may either pursue the Ph.D. degree or obtain postdoctoral research training in the biomedical sciences. Annual stipends of up to \$25,000 are determined on an individual basis. When the training period is completed, fellows are encouraged to return to their home institutions for a period to teach and conduct research. Awardees are subject to the NRSA payback requirements. From 1972 to 1991, an estimated cumulative total of 218 faculty members received MARC Faculty Fellowship awards ranging from 1 to 5 years (see figure 23).

In addition to the three major MARC initiatives mentioned above, the MARC Visiting Scientist Program (see figure 24) fellowships)

provides support for a period of up to 12 months to outstanding scientist-teachers who serve as visiting scientists at eligible minority institutions. The award entails detailed arrangements for the visiting scientist to reside in the campus community and to participate fully in teaching, research development, and counseling activities. Stipends are determined on an individual basis. The primary intent of the program is to strengthen research and teaching in the biomedical sciences for the benefit of the students and faculty at these institutions by drawing upon the special talents of scientists from other, primarily majority, institutions. Benefits may also accrue to the visiting scientist through his or her involvement in innovative science education and research programs. The opportunity for these awards has existed since 1972, but they have been undersubscribed, and only a few MARC Visiting Scientist awards have been made.

NATIONAL PREDOCTORAL FELLOWSHIP AWARDS FOR MINORITY STUDENTS

Beginning in 1991, the NIGMS established a new national program, announced by a special Request for Application (RFA), entitled Predoctoral Fellowship Awards for Minority Students. This new type of F31 fellowship was designed to expand the pool of eligible underrepresented minority student applicants to include individuals who received their B.S. degree from non-MARC schools. The new program extended eligibility to all former MBRS-supported students as well as to hundreds of underrepresented minority students with B.S. degrees from any college or university in the Nation. The nature of support for this new predoctoral fellowship is identical to the MARC Predoctoral Fellowship Program, with awards for up to 5 years being conditional upon acceptance of the student into an approved doctoral degree (Ph.D.) or combined-degree (M.D./Ph.D.) program in the biomedical sciences. Awardees are also subject to the NRSA payback requirements.

The 53-person Minority Programs Fact-Finding Team that was convened by the NIH Office of Minority Programs in 1991 strongly supported the decision to expand the Predoctoral Fellowship Program. In FY 1991, 150 applications for the new national Predoctoral Fellowship Award for Minority Students Program were received and reviewed, and 101 fellowship awards were made to underrepresented minority students at a

total cost of \$2,327,000. Funds were provided by the NIGMS, other ICD's, and the NIH Office of Minority Programs.

RESEARCH CENTERS IN MINORITY INSTITUTIONS (RCMI) PROGRAM

The RCMI Program of the National Center for Research Resources (NCRR), formerly the DRR, was established in 1985 to expand the national capability for research in the health sciences by providing grant support to institutions with predominantly underrepresented minority student enrollments that offer doctorate degrees in the health professions and/or health-related sciences. Although NIH funding for research and research training at institutions with substantial underrepresented minority enrollments grew dramatically since the early 1970's, largely as a result of the MBRS and MARC programs, a large portion of NIH research and training dollars was being given to relatively few large majority research universities. The RCMI Program was designed to enhance significantly the capacity for the conduct of biomedical and/or behavioral research at eligible minority institutions that historically had not been major participants in NIH programs.

The RCMI Program assists eligible health professional schools and graduate institutions having more than 50 percent underrepresented minority student enrollment to strengthen and expand their human and physical resources for the conduct of biomedical and/or behavioral research. The program provides for faculty development, enrichment and expansion; renovation of laboratories and animal facilities; acquisition of state-of-the-art instrumentation; enhancement of grants management and research development activities; improvement of biostatistical and computer resources; development of new technologies; and other institutional infrastructure activities designed to assist such institutions in becoming more competitive. In addition to providing support for major biomedical research initiatives, start-up funds are provided through RCMI to help individual faculty members develop research projects and to position investigators to compete successfully for other research funds after a limited period of RCMI support.

Each RCMI grantee institution has a designated biomedical scientist serve as program director, with responsibility for

administering the center and coordinating research-related activities. In addition, each center must have a principal investigator to oversee the grant, usually the president of the institution or another high ranking official, along with an RCMI Advisory Committee responsible for developing general policies; monitoring overall operations, program management, and accomplishments; prioritizing needs; and identifying consultative and other resources. Awards of up to \$1 million a year (for direct costs) per institution may be made for the core RCMI Program, for a 3- to 5-year project period. Support for developing an infrastructure within an RCMI-funded institution for AIDS research or human genome research (or other high-priority initiatives that are jointly supported by the RCMI Program and other NIH grant programs) is excluded from this dollar limitation.

As shown in figure 24, the number of minority institutions participating in the RCMI Program has increased from 7 to 17 since the program was formally established in 1985. RCMI funding has steadily increased since 1985 (see figure 25), and in FY 1991, RCMI institutions received a total of \$22.2 million from the NIH to further expand their capability for research and research training in the health sciences. Altogether, approximately 657 faculty members have received RCMI support as scientific investigators responsible for special research projects since the establishment of the RCMI Program in 1985, with 319 receiving support in FY 1991 (see figure 26). The number of different biomedical research projects (known as subprojects) supported with RCMI funds has also increased; approximately 416 different subprojects have been supported for varying periods of time from 1986 through 1991, 186 of which received funding in FY 1991 (see figure 27).

Three approaches have been used by the NCRR to evaluate how well the RCMI Program is achieving its objectives. First, the total amount of research funds awarded to grantees at RCMI institutions has been tracked each year, showing institutional trends before the establishment of the RCMI Program as well as since its inception in 1985. Results reveal that total Public Health Service grant support to the 17 current RCMI institutions (excluding targeted minority grant support) has increased 29 percent, from an average of \$31.6 million per year from FY 1980 through FY 1984, to an average of \$40.8 million per year during the period FY 1985 through FY 1991. Similarly, total NIH grant support to the RCMI institutions (excluding targeted minority grant support) has increased

from an average of \$17.4 million per year from FY 1980 through FY 1984 to an average of \$25.3 million during FY 1985 through FY 1991, representing a 45 percent increase. Although this signifies a substantial rise in nontargeted NIH support for research and development (R&D) activities at RCMI institutions, and the level of support at these institutions had not shown an upward trend from FY 1980 through FY 1984, total NIH funding for R&D activities at all NIH-supported institutions increased at a higher rate (76 percent) when these two periods are compared.

The second type of evaluation of the RCMI Program implemented by the NCCR has been to require RCMI grantees seeking competitive renewal or supplemental funding to be evaluated during peer review on the basis of their progress and achievements in areas targeted by RCMI as well as on other review criteria. Specifically, RCMI grantees seeking additional support are asked to demonstrate evidence of their progress and achievements in improving the research environment, developing the institution's biomedical and/or behavioral research capability, improving the infrastructure, fostering faculty development and achievement, and increasing research productivity.

The third type of evaluation is the mid-course assessment, which is part of the management strategy used to assess the impact of RCMI grant awards at the end of the first 3 years of RCMI funding. This assessment is conducted by ad hoc committees of peer scientists and is used by the grantee institutions and the RCMI Program staff to make midcourse corrections as necessary.

THE MINORITY HIGH SCHOOL STUDENT RESEARCH APPRENTICESHIP PROGRAM (MHSSRAP)

The MHSSRAP, also referred to as the Minority High School Program, currently has a twofold purpose: (1) to provide minority high school students with a meaningful experience in various aspects of health-related research to stimulate their interest in pursuing careers in biomedical research and the health professions and (2) to provide high school teachers with the opportunity to participate in a summer research project to update their scientific knowledge base.

This research-related grant program, established in 1980 by the NCCR, is open to all institutions that were awarded MBRS grants or Biomedical Research Support (BRS) grants during the most recent Federal fiscal year. As shown in figure 28, the number of institutions participating in the Minority High School Program has gradually increased. In FY 1991, Minority High School Program grants were awarded to 44 MBRS institutions and 347 BRS institutions, 35 percent of which were graduate schools, 27 percent medical schools, 22 percent other health professional schools, 10 percent research organizations, and 7 percent hospitals.

As shown in figure 29, funding for the Minority High School Program remained fairly stable until FY 1991, when support increased substantially as the program was expanded to include funding for high school teachers and a larger number of students. In FY 1992, institutions participating in the Minority High School Program received \$8.9 million from the NIH to provide minority high school students and their teachers an opportunity to participate in summer research projects.

To be eligible for the Minority High School Program, students must be enrolled in high school, members of a minority group, and recommended by high school science teachers or advisors. Teachers, who are recruited and selected by the program director for each MHSSRAP grant, must be members of a minority group or teach a substantial number of underrepresented minority high school students.

Students are paired with NIH-supported individuals at the funded institution who are involved in health-related research and committed to developing student interest. During the summer, students are given a hands-on introduction to the latest health science research, working on a wide range of research problems, collecting data, and reporting findings in written papers and seminars. In 1990, 28 percent of student participants were seniors, 48 percent juniors, and 20 percent sophomores. In a 1990 survey conducted by the NCCR, 97 percent of student respondents reported that they planned to attend college, 79 percent were planning for a future career in biological or health professional sciences, and 46 percent indicated that the Minority High School Program had influenced their choice of a research career.

The program currently provides support to nearly 3,000 students and 570 science teachers (see figure 30). Support is provided at a level of \$2,000 per student apprentice and \$5,000 per teacher for a 6- to 8-week summer research experience. Funds may also be used for an extension of the research experience, supplies, or other educational activities. Beginning in FY 1994, the Minority High School Program will be converted from a 1-year grant to a 3-year competitive grant program, with all applications for continuing support being peer reviewed for scientific and technical merit.

The race/ethnicity distribution of student participants, based on combined data collected in FY 1981, 1986, 1988, and 1990, was as follows: approximately 64 percent African-American, 14 percent Hispanic, 3 percent Native American, and 18 percent Asian/Pacific Islanders.

The NCRR has pursued several approaches to evaluating the Minority High School Program. Preliminary discussions have been held with representatives of the AAMC to examine the feasibility of matching students who have received MHSSRAP support in the past with the AAMC database of medical school applicants, students, and residents known as the Student and Applicant Information Management System (SAIMS). The NCRR is also working with the Planning Policy and Research Branch, Office of Science Policy and Legislation, NIH, to access and match with the DRF maintained by the NRC. In addition, the NCRR is assessing the educational and career progress of former MHSSRAP participants by collecting and assembling a series of institutional profiles of grantee institutions where systematic attempts have been made to conduct followup. At the present time, the NCRR is actively pursuing ways to obtain funding for each of these evaluation studies. In addition, the NCRR has requested, through the Office of Planning and Evaluation, a formal third-party evaluation study of the Minority High School Program using DHHS 1 percent evaluation set-aside funds.

RESEARCH SUPPLEMENTS FOR UNDERREPRESENTED MINORITY INDIVIDUALS

During 1987 and 1988, the Director of the NIH and the Advisory Committee to the Director held a series of regional meetings throughout the United States. At these meetings, testimony was presented by concerned individuals and

organizations regarding the underrepresentation of minorities in biomedical and behavioral research. Although the NIH has for some years provided opportunities for minorities through the traditional research grant programs and through special initiatives supported by various components of the NIH, most of which have been described in this report, the testimony indicated that efforts of the NIH should be increased.

In response to these concerns, a new program was established by the NIH in 1990 to allow supplemental funds for NIH-supported grants for the purpose of attracting minorities into biomedical and behavioral research. Under the Research Supplements Program, principal investigators holding NIH research grants may apply for administrative supplements to existing grants to support the research endeavors of underrepresented minority scientists and students. The long-term goal of these supplements is to attract and encourage such minority individuals to pursue biomedical and behavioral research careers in areas within the missions of all the awarding components of the NIH.

Principal investigators at domestic institutions who hold an active G12, R01, R10, R18, R22, R24, R29, R35, R37, P01, P20, P30, P40, P41, P50, or P60 grant or a U01 cooperative agreement awarded by NIH are eligible to submit a request for an administrative supplement to the awarding component of the parent grant for any of the above-mentioned supplemental programs. The minority supplement programs have been designed to attract underrepresented minority individuals into research careers and are not intended to provide an alternative means of supporting minority individuals who already receive regular support from a research grant or other PHS funding mechanism.

A short summary of each of the components of the NIH Research Supplements Program is presented below.

**RESEARCH
SUPPLEMENTS FOR
MINORITY HIGH
SCHOOL STUDENTS**

These awards provide support for minority high school students expressing an interest in biomedical or behavioral sciences. The purpose of the program is to provide minority high school students with a meaningful research experience to stimulate interest in pursuing careers in science. Any principal investigator holding an active NIH research grant may be eligible to submit a request for an administrative supplement to support a minority high school student. The NIH currently supports this program at over 350 research

[REDACTED]

institutions throughout the United States. These supplements provide up to \$2,000 for the summer experience, including supplies. Support is provided for a minimum of 3 months' duration per year but is expected to last over a period of at least 2 years. Students are expected to devote full-time effort to the research project and related activities during the period of support. The program also includes a high school science teaching initiative to allow teachers to participate in a summer research project to update their scientific skills.

**RESEARCH
SUPPLEMENTS FOR
MINORITY
UNDERGRADUATE
STUDENTS**

These awards provide support for minority undergraduate students who have demonstrated an interest in biomedical or behavioral sciences and wish to continue on to graduate level training in these areas. Participating undergraduate students may be affiliated with either the applicant institution or another academic institution. These supplements provide \$6 per hour for salary plus \$125 per month for supplies and travel. Support is provided for a minimum of 3 months' duration per year but is expected to last over at least 2 years. Students supported during the summer are expected to devote full-time effort to the research project and related activities, and a part-time effort is required of students supported during the academic year.

**RESEARCH
SUPPLEMENTS FOR
MINORITY GRADUATE
RESEARCH ASSISTANTS**

These awards provide support to assist minority predoctoral students who wish to develop research capabilities in the biomedical and behavioral sciences. The supplements provide salary and related expense support for minority graduate research assistants who are actively pursuing doctoral degrees in one of the biomedical or behavioral sciences. The awards are intended to enable the minority individual to participate as a graduate research assistant on funded research projects. Students are expected to devote full-time effort to the research project and related activities during the period of support.

**RESEARCH
SUPPLEMENTS FOR
MINORITY INDIVIDUALS
IN POSTDOCTORAL
TRAINING**

These awards provide support for minority individuals who wish to participate as postdoctoral researchers in ongoing research projects in preparation for independent careers in biomedical or behavioral research. Participating minority postdoctoral students may be affiliated with either the applicant institution or any other institution. The supplement provides support for the student's salary in addition to other necessary expenses such as travel and supplies to enable the minority individual to participate as a postdoctoral research assistant or associate on the funded research project.

RESEARCH
SUPPLEMENTS FOR
MINORITY
INVESTIGATORS

These awards provide short- and long-term opportunities for minority staff and faculty who wish to participate in ongoing research projects while further developing their own independent research potential. Short-Term Minority Investigator Research Supplements provide support for minority staff or faculty members to conduct full-time research for 3 to 5 months each year during the summer or another portion of the academic year, over a maximum of 4 years. Long-Term Minority Investigator Research Supplements provide support for minority staff or faculty members to conduct research in the biomedical or behavioral sciences for up to 4 years at a minimum of 30 percent effort during each 12-month period. The minority investigator must have a doctoral degree, be beyond the level of a research trainee, and be a member of the staff or faculty of the applicant institution or any other institution, with at least 1 year of postdoctoral experience. This supplement provides for a maximum of \$50,000 in direct costs per year, including up to \$40,000 for salary and fringe benefits and up to \$10,000 for supplies and travel.

For all of the above research supplements, the proposed research experience must be an integral part of the approved ongoing research of the parent grant. As part of this research experience, the minority individual must be given the opportunity to interact with individuals on the parent grant, to contribute intellectually to the research, and to enhance his/her research skills and knowledge regarding the particular area of biomedical science. Furthermore, the principal investigator must demonstrate a willingness and understanding that the purpose of the award is to enhance the research capability of the minority student or faculty member and that the research experience is intended to provide opportunities for minority individuals to develop as independent, competitive research investigators.

Supplemental awards will be consistent with the goal of strengthening the existing research program and with the overall programmatic balance and priorities of the funding component of the NIH.

Overall funding for the Minority Research Supplements Program increased from \$12.3 million in the first year (FY 1990) to \$20.7 million in FY 1991, and there is strong support for the program throughout the NIH. Minority research supplement funds awarded by individual NIH ICD's are presented in figure 31. A total of 267 Minority Research

Supplements were awarded in FY 1990, representing 2.56 percent of the number of research grants eligible for minority supplements. There was a significant increase in the number of supplemental awards in FY 1991, the second year of the program, with a total of 659 new Minority Research Supplements being awarded, representing 3.52 percent of total eligible research grants. The racial/ethnic distribution and career levels of these individuals are shown in figures 32 and 33.

THE MINORITY CLINICAL ASSOCIATE PHYSICIAN (MCAP) PROGRAM

The MCAP is a new program implemented in 1991 by NCRR and modeled after NCRR's Clinical Associate Physician (CAP) Program. It provides an opportunity for young underrepresented minority physicians and dentists to develop into independent clinical investigators in a General Clinical Research Center (GCRC) environment.

The MCAP Program provides up to 3 years of support to minority physicians and dentists, under the direction of senior clinical scientist sponsors, to promote their development toward becoming independent clinical investigators capable of successfully competing for independent peer-reviewed grant support. An MCAP applicant must be a member of an underrepresented minority group and must have earned an M.D. or D.D.S. degree or equivalent and completed a residency program. One MCAP application may be submitted from a Center per review cycle. MCAP applicants who have completed subspecialty (fellowship) training may request a maximum salary of \$50,000 plus fringe benefits for the first year of the award. For those MCAP applicants with no subspecialty training, the maximum award is \$45,000.

Three MCAP awards were made in FY 1991, all three to African-Americans, for a total amount of support of approximately \$72,300 (direct costs). In FY 1992, seven minority individuals received MCAP support (four African-Americans and three Hispanics), for a total amount of support of approximately \$305,200 (direct costs).

OTHER NIH MINORITY RESEARCH/TRAINING SUPPORT PROGRAMS

In addition to the minority research/training support programs described above, individual components of NIH support smaller programs designed to encourage minority individuals to pursue careers in biomedical research.

THE MINORITY SCHOOL FACULTY DEVELOPMENT AWARD

The Minority School Faculty Development Award Program, established in 1985, is supported by the National Heart, Lung, and Blood Institute (NHLBI). The program has a twofold purpose: (1) to encourage the development of faculty investigators at minority schools who have the interest and capabilities of doing modern, sophisticated research in cardiovascular, pulmonary, and hematologic diseases and transfusion medicine and (2) to stimulate cardiovascular, pulmonary, and hematologic disease research, prevention, control, and education by offering minority school faculty members the opportunity to enhance their research capabilities in these areas.

These K14 research career grants are made to minority institutions on behalf of awardees, each of whom works with a mentor at a nearby research center who is recognized as an accomplished investigator in the research area proposed and who will provide guidance for the awardee's development and research plan. The awardee receives salary support up to a maximum of \$50,000 plus fringe benefits per year, based upon the candidate's actual salary and the proportion of effort devoted to the program. Up to \$20,000 a year is provided for research support.

To date, 35 Minority School Faculty Development grants have been awarded. NHLBI recently completed an assessment of the status of the Minority Faculty Development Award Program, as discussed in Section 5.

THE NHLBI MINORITY INSTITUTIONAL RESEARCH TRAINING PROGRAM

This program was also initiated in 1985 by the NHLBI. The program is designed to offer research training grant awards (T32 training grants) to minority institutions in areas relevant to cardiovascular, pulmonary, and hematologic diseases to enable qualified graduate students and postdoctoral fellows to participate in research programs. The minority institution must identify and collaborate with a research center (medical school or comparable institution) that has strong, well-established programs of cardiovascular, pulmonary, or

hematologic research and research training. Cooperation between the institutions provides each trainee with a mentor at the research center who assists an advisor at the minority institution in the trainee's development and research plan. To date, a total of six NHLBI Minority Institutional Research Training Program grants have been awarded to minority institutions.

THE NHLBI SHORT-TERM TRAINING FOR MINORITY STUDENTS PROGRAM

The purpose of this NRSA training program is to provide minority undergraduate students, graduate students, and students in health professional schools exposure to opportunities inherent in research careers in areas relevant to cardiovascular, pulmonary, and hematologic diseases. The program was established by the NHLBI in 1991 to provide short-term training experiences of 2 to 3 months in duration. It is designed to attract highly qualified minority students into biomedical and behavioral research careers and bolster the already short supply of qualified minority investigators. Domestic organizations or institutions with staff and resources in the areas of cardiovascular, pulmonary, or hematologic disease are encouraged to apply for this T35 training grant. To date, 24 NHLBI Short-Term Training grants have been awarded.

THE NIDDK RESEARCH TRAINING OF UNDERREPRESENTED MINORITIES PROGRAM

The Division of Digestive Diseases and Nutrition within the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) supports efforts to increase the number of underrepresented minority physicians and basic scientists by providing a minimum of 2 years of research training through its Institutional National Research Service Awards (T32 training grants). Minority individuals are assigned T32 positions held in reserve for this purpose and receive their research training under the guidance of nationally recognized researchers. This research training support mechanism prepares these trainees to compete successfully for NIH grants and provide leadership in the biomedical sciences and academic medicine. This program was initiated in 1990 with the support of two postdoctoral trainees, and in 1992, six minority individuals were supported.

THE NIDDK MINORITY TRAVEL AWARD PROGRAM (MTAP)

This program, supported by the NIDDK, provides up to \$1,000 of travel support for minority college students and faculty at minority institutions to accompany principal investigators funded by the NIDDK to national scientific meetings related to the interests of the Institute. Principal investigators on NIDDK research grants are eligible to apply

for administrative supplements to offset travel expenses of attending such meetings. Undergraduate minority students who are interested in biomedical research careers are eligible for this MTAP award. This program was initiated in the late 1980's and, although still a viable award, has been supplanted in part by the NIH program of Research Supplements for Underrepresented Minority Individuals.

THE NIH EXTRAMURAL
ASSOCIATES (EA)
PROGRAM

This program is directed toward improving opportunities for women and minority institutions to participate in and contribute toward biomedical research. To achieve this purpose, the NIH invites key scientific faculty and academic administrators from minority and women's institutions to participate in training and in rotating work assignments at the NIH and elsewhere. The Extramural Associates gain knowledge about Federal health-related programs, grants and contracts operations, grant support mechanisms, and policies and procedures that govern grant awards. The EA Program consists of coursework, working assignments, and other experiences designed for each Extramural Associate in consultation with a senior NIH scientist administrator, who also serves as the Associate's advisor. Historically black colleges and universities, other minority institutions, and women's colleges may apply and are encouraged to nominate their faculty in the biomedical or behavioral sciences for the Extramural Associates Program. Approximately 116 institutions have participated, and 131 Extramural Associates have graduated from the Extramural Associates Program from 1978 through 1991.

BRIDGESTO THE **FUTURE PROGRAM**

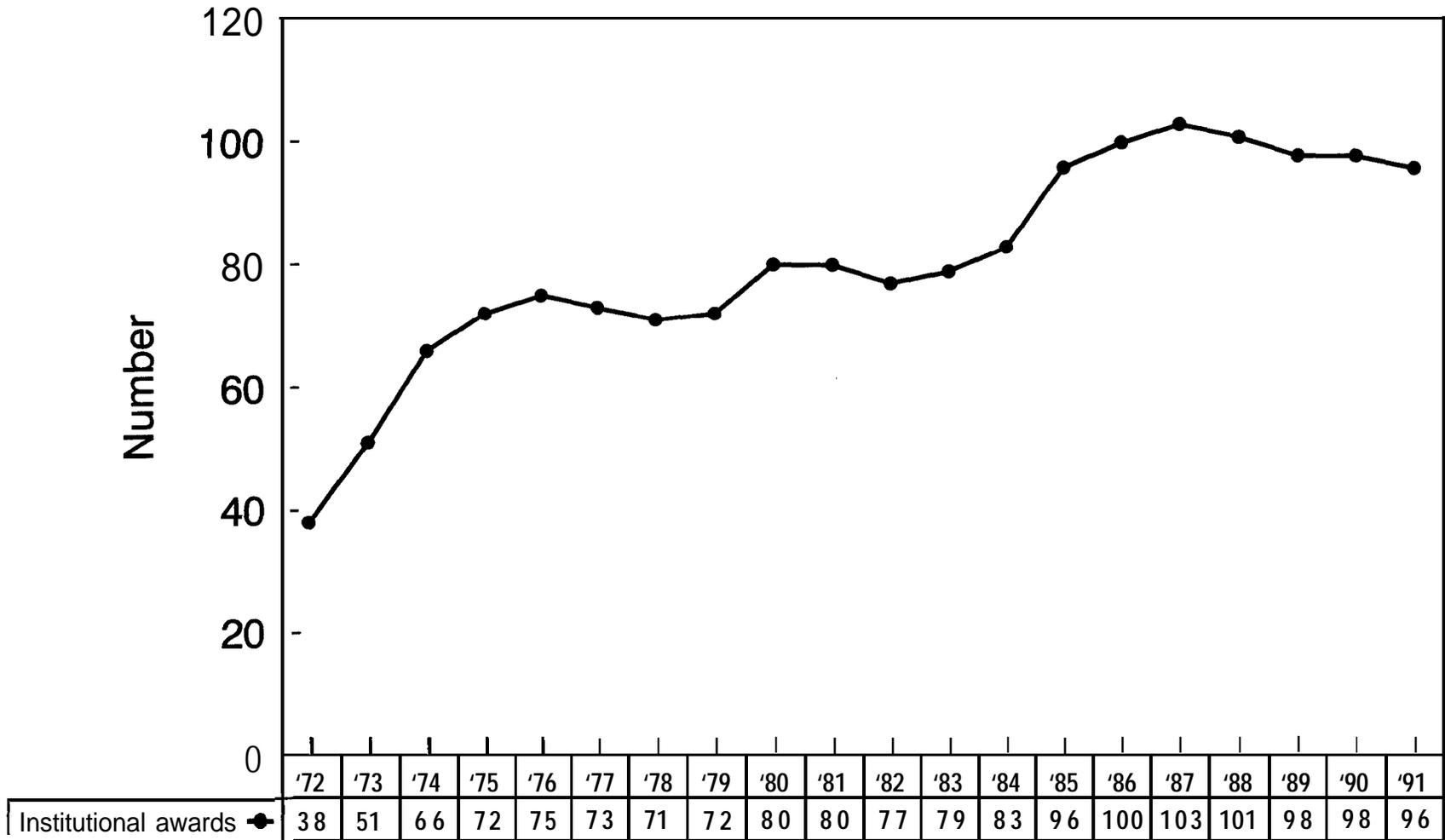
In 1992, the NIH Office of Research on Minority Health and the NIGMS announced two programs to assist underrepresented minority students in progressing through higher education. The Bridges to the Future Program targets two different student populations—those attending 2-year junior or community colleges and those enrolled in terminal master of science programs. The program was designed to provide incentives and support during two different key transition points for students considering research careers. The 2-Year/4-Year Bridge Program assists students in making the transition from junior college to an institution with a baccalaureate degree program, and the M.S./Ph.D. Bridge Program helps students by linking institutions with terminal

master's degree programs with schools offering Ph.D.'s in science.

The Bridges to the Future Program was first announced in the spring of 1992 and received 59 applications. A total of nine awards were made in FY 1992, totaling \$2 million. The Request for Application was revised and released for the second time in October 1992. The ORMH intends to provide \$5 million in FY 1993 for the 2-Year/4-Year Bridge Program and an additional \$5 million for the M.S./Ph.D. Bridge Program. The NIGMS will provide administrative and management support for both of the programs.

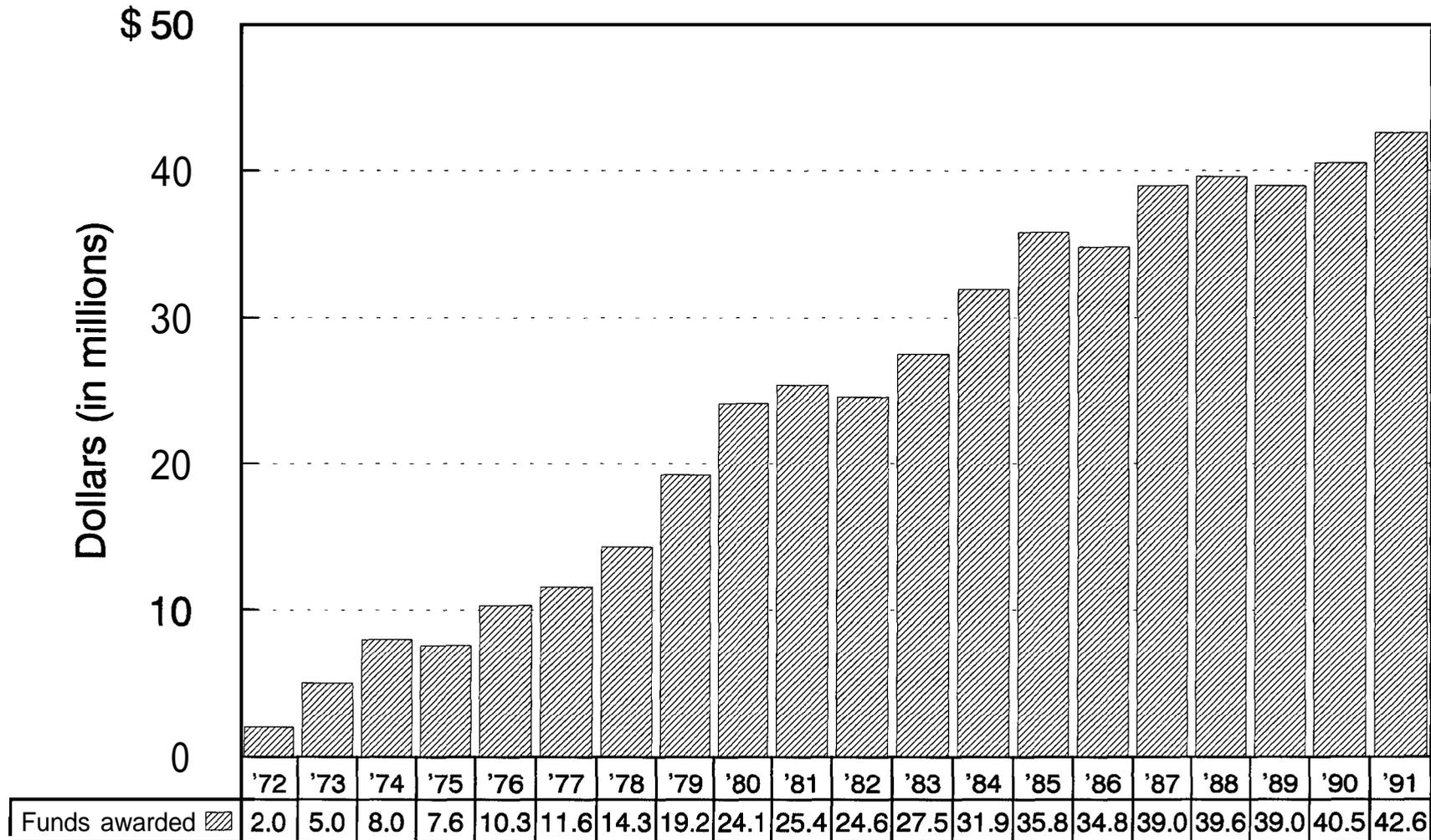
Taken together, these two programs complement the existing NIH minority research/training programs that have been described in this section, specifically addressing the need to attract underrepresented minorities to research at an early age and encourage the development of innovative approaches to improve the academic competitiveness of underrepresented minority students pursuing careers in biomedical research.

Figure 14
 NIH Minority Biomedical Research Support (MBRS) Program
 (S06 and S14 Grants)
 Number of Institutional Awards
 FY 1972-i 991



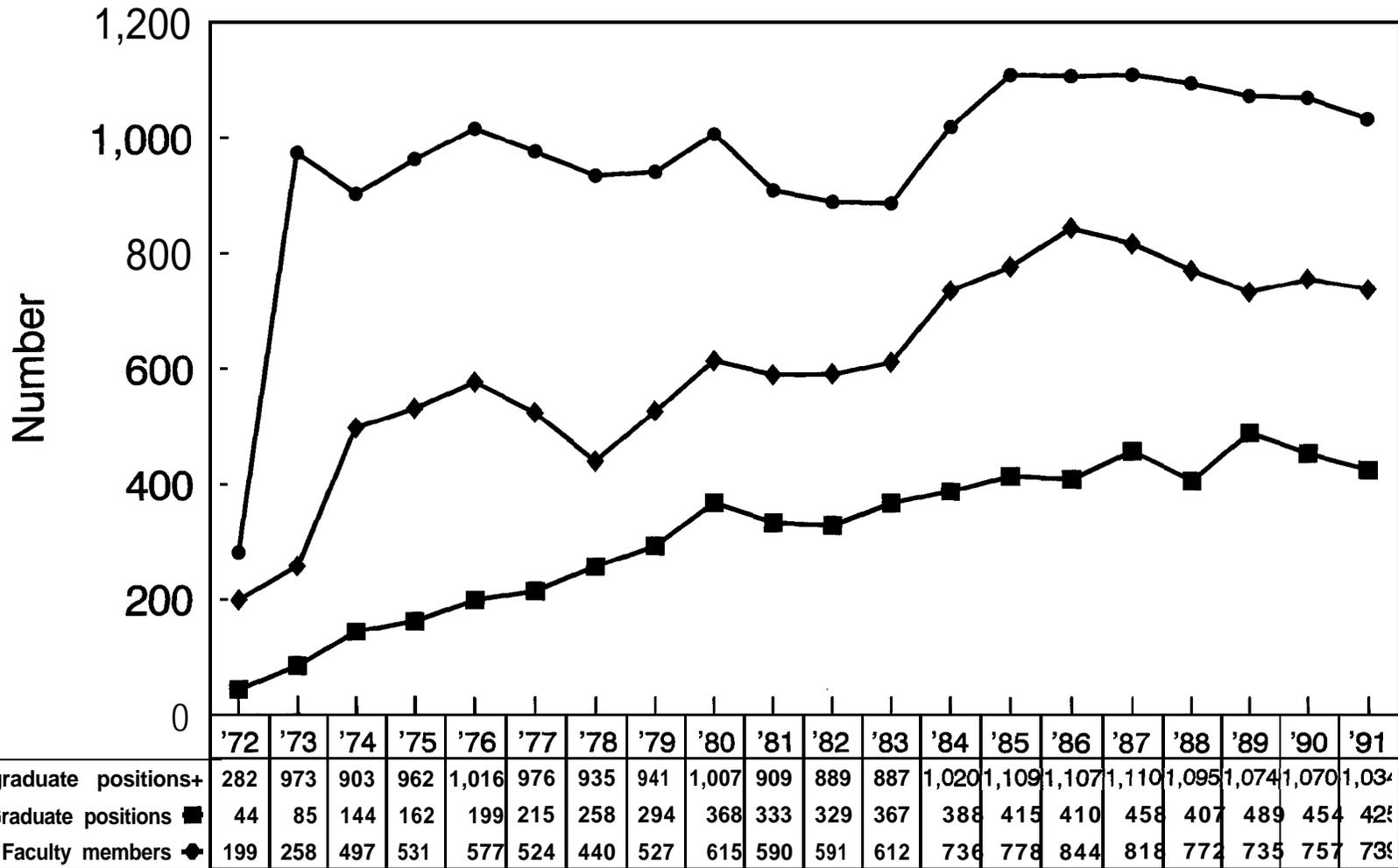
Data source: NIGMS.

Figure 15
 NIH Minority Biomedical Research Support (MBRS) Program
 (S06 and S14 Grants)
 Total Amount of Support
 FY 1972-1 991



Data source: NIGMS.

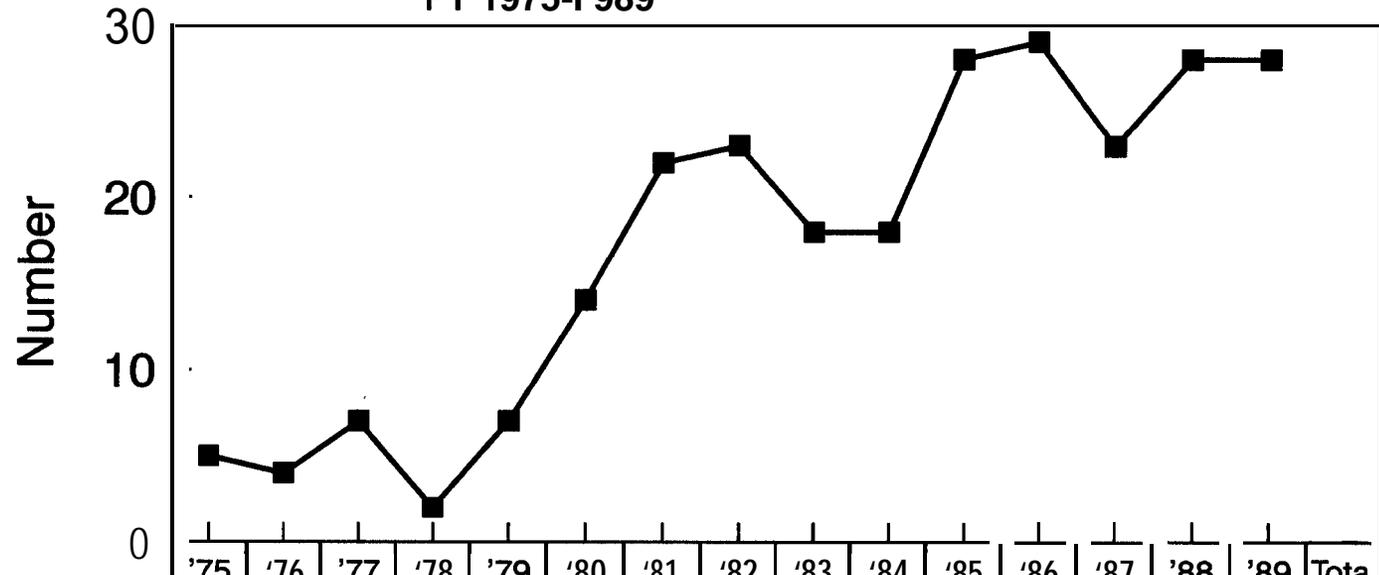
Figure 16
 NIH Minority Biomedical Research Support (MBRS) Program
 (S06 and S14 Grants)
 Number of Student Positions and Faculty Supported
 FY 1972-1991



Note: A cumulative total of approximately 16,500 undergraduate and graduate students and approximately 1,600 faculty members received MBRS support for varying periods of time from 1972 through 1991.

Data source: NIGMS

Figure 17
 NIH Minority Biomedical Research Support (MBRS) Program
 (S06 and S14 Grants)
 Underrepresented Minority* MBRS-Supported Students
 Who Received Ph.D. Degrees by Year of Degree
 FY 1975-I 989



	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	Tota
Native American	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hispanic	1	0	4	1	0	2	4	6	6	4	12	12	8	12	17	89
African American	4	4	3	1	7	12	18	17	12	14	16	17	15	16	11	167
Asian/Pacific Islander	0	0	0	1	0	1	0	1	2	1	1	1	1	0	2	11
White	0	0	0	1	1	1	0	4	1	3	4	3	5	5	4	32
Other race reported	0	0	0	0	0	0	2	0	0	0	0	0	0	3	0	5
Total	5	4	7	4	8	16	24	28	21	22	33	33	29	36	34	304
Total for underrep'd minorities ■	5	4	7	2	7	14	22	23	18	18	28	29	23	28	28	256

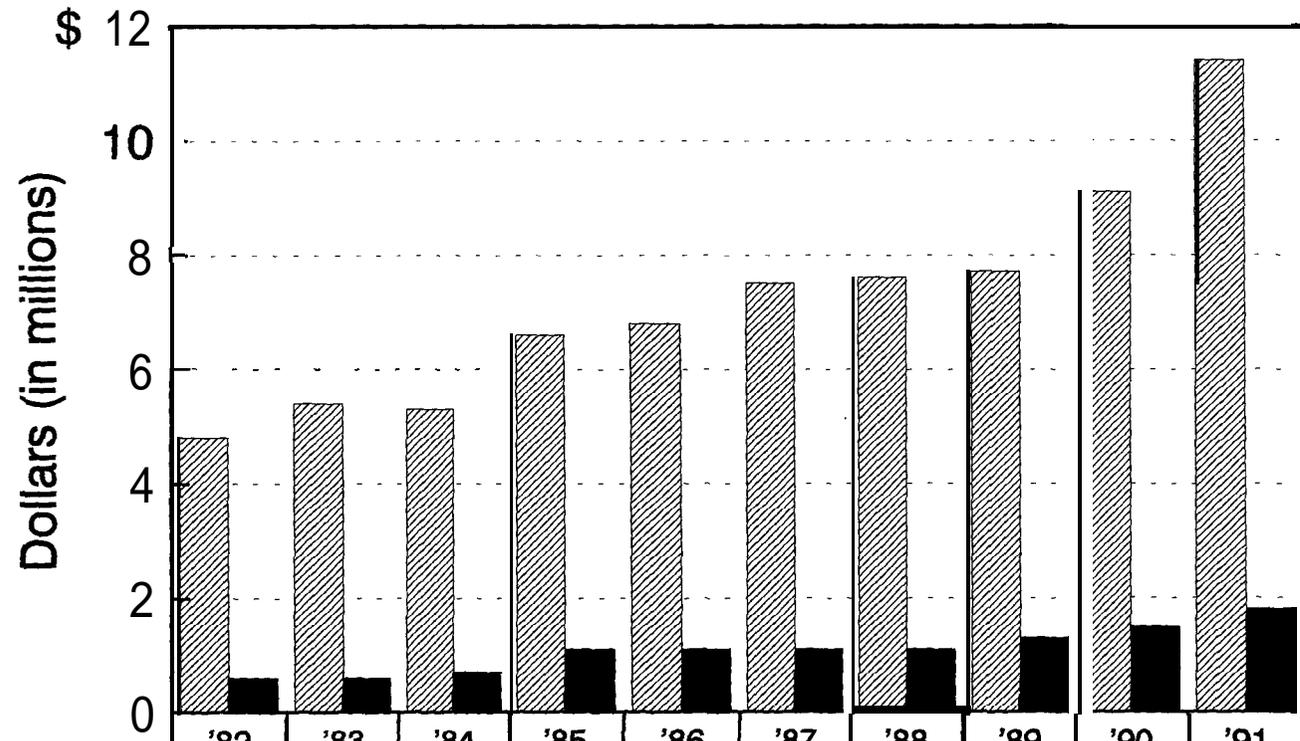
* "Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Note: Data represent students who received MBRS support and were found in the Doctorate Records File from a cohort of 15,503 undergraduate and graduate students who received MBRS support for varying periods of time from 1972 through 1989. There may be errors in records or missing data, resulting in underreporting.

Data source: NIGMS.

Figure 18

NIH Minority Access to Research Careers (MARC) Program
 Total Amount of Support for MARC Training Grants and Fellowships
 FY 1982-1991

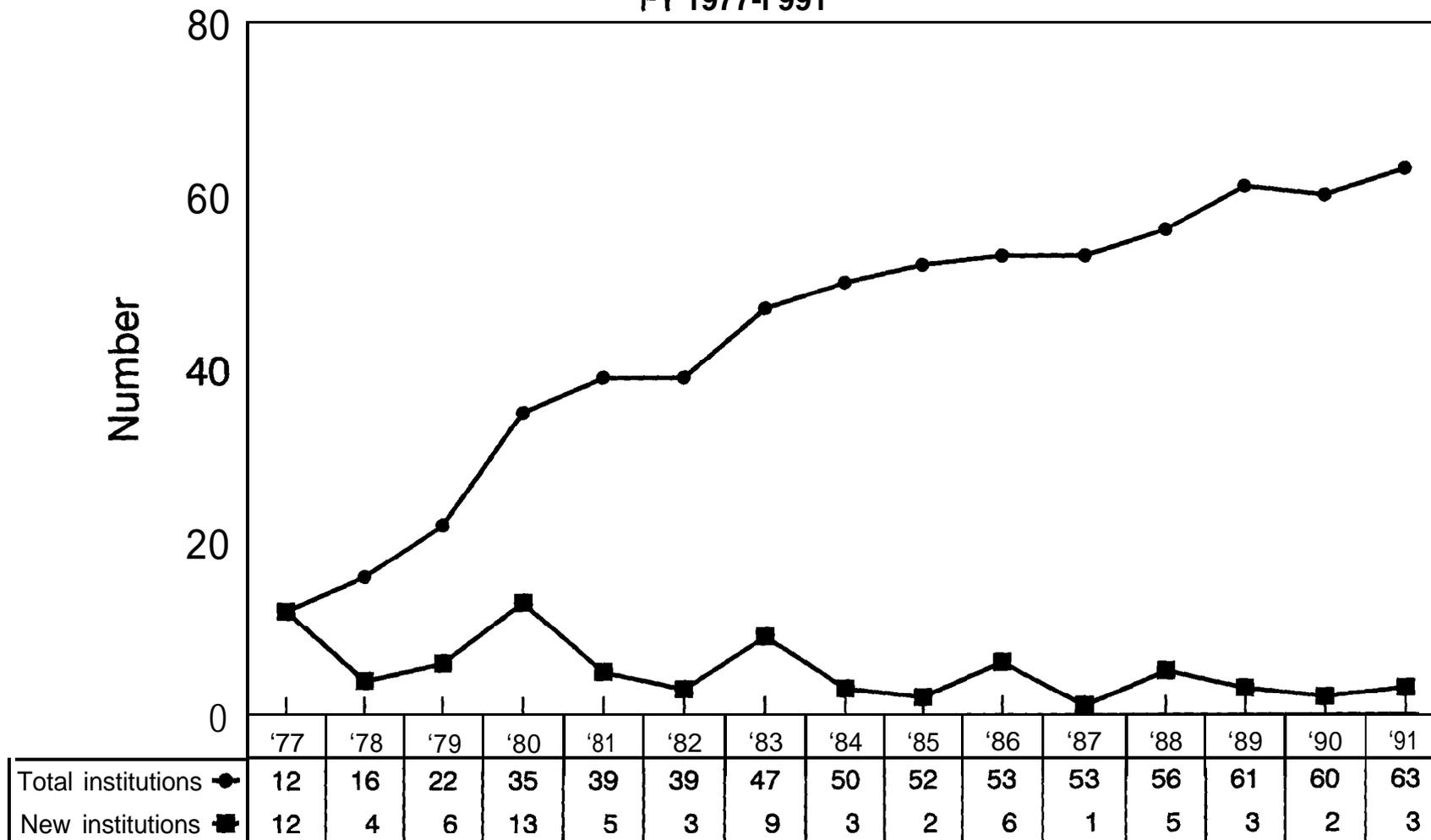


MARC training grants (T32, T34) awarded to institutions	▨	4.8	5.4	5.3	6.6	6.8	7.5	7.6	7.7	9.1	11.4
MARC fellowships (F31, F34, F36) awarded to individuals	■	0.6	0.6	0.7	1.1	1.1	1.1	1.1	1.3	1.5	1.8
Total, MARC Program		5.4	6	6	7.7	7.9	8.6	8.7	9	10.6	13.2

Note: The above figures include three T32 training grants awarded to minority institutions.

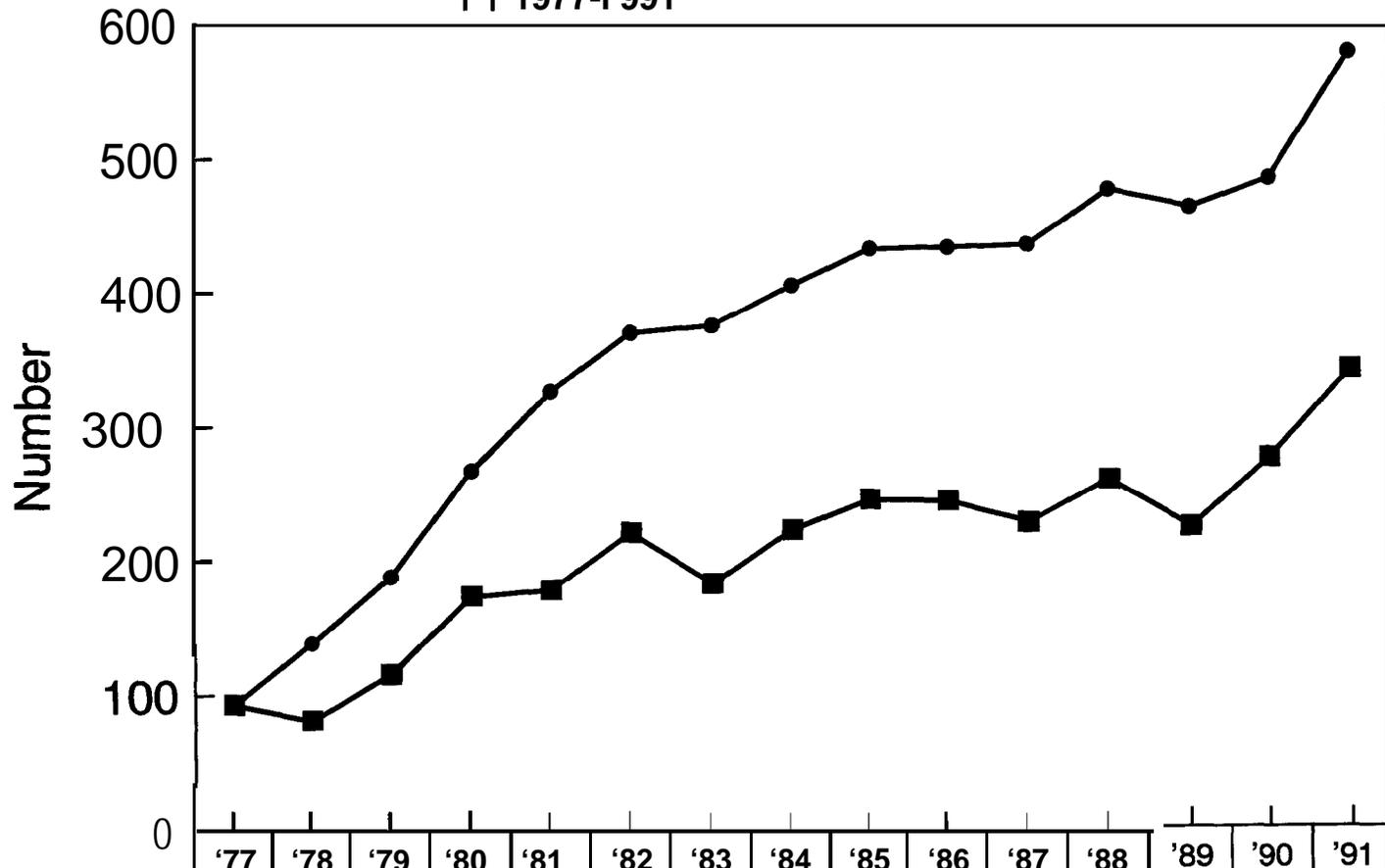
Data source: NIGMS.

Figure 19
 NIH Minority Access to Research Careers (MARC) Program
 Honors Undergraduate Research Training Program
 (T34 Training Grants)
 Number of Institutions Supported
 FY 1977-I 991



Data source: NIGMS.

Figure 20
 NIH Minority Access to Research Careers (MARC) Program
 Honors Undergraduate Research Training Program
 (T34 Training Grants)
 Number of Students Supported
 FY 1977-I 991

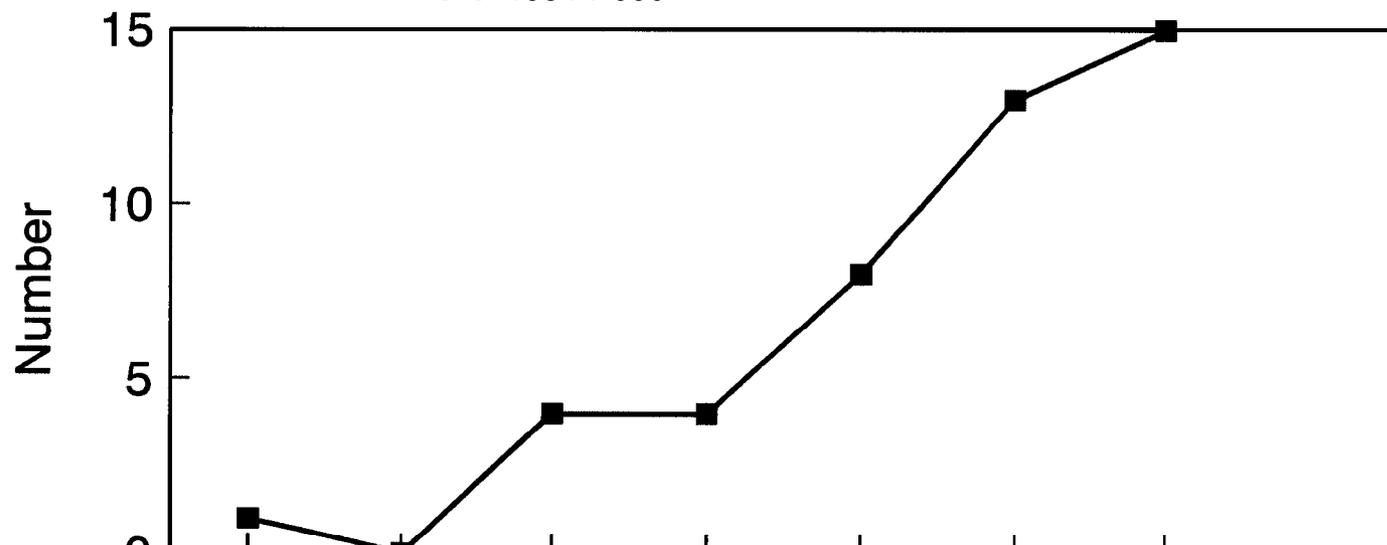


Total undergraduate students	93	138	188	266	326	369	374	404	431	432	434	475	462	483	576
New undergraduate students	93	81	115	173	178	220	182	222	244	243	227	259	224	275	341

Note: A cumulative total of at least 3,312 undergraduate students received MARC training grant support for varying periods of time from 1977 through 1991. The marked increase in the number of students supported in 1991 reflects the expansion of the program to include 57 freshmen and sophomores.

Data source: NIGMS.

Figure 21
 NIH Minority Access to Research Careers (MARC) Program
 (T34 Training Grants)
 Underrepresented Minority* MARC-Supported Trainees
 Who Received Ph.D. Degrees by Year of Degree
 FY 1984-1 990



	'84	'85	'86	'87	'88	'89	'90	Total
Native American	0	0	0	0	0	0	0	0
Hispanic	0	0	2	3	4	5	8	22
African American	1	0	2	1	4	8	7	23
Asian/Pacific Islander	0	0	0	1	1	1	0	3
White	0	0	1	1	1	1	0	4
Other race reported	0	0	0	1	1	0	0	2
Total	1	0	5	7	11	15	15	54
Total for underrep'd minorities+	1	0	4	4	8	13	15	45

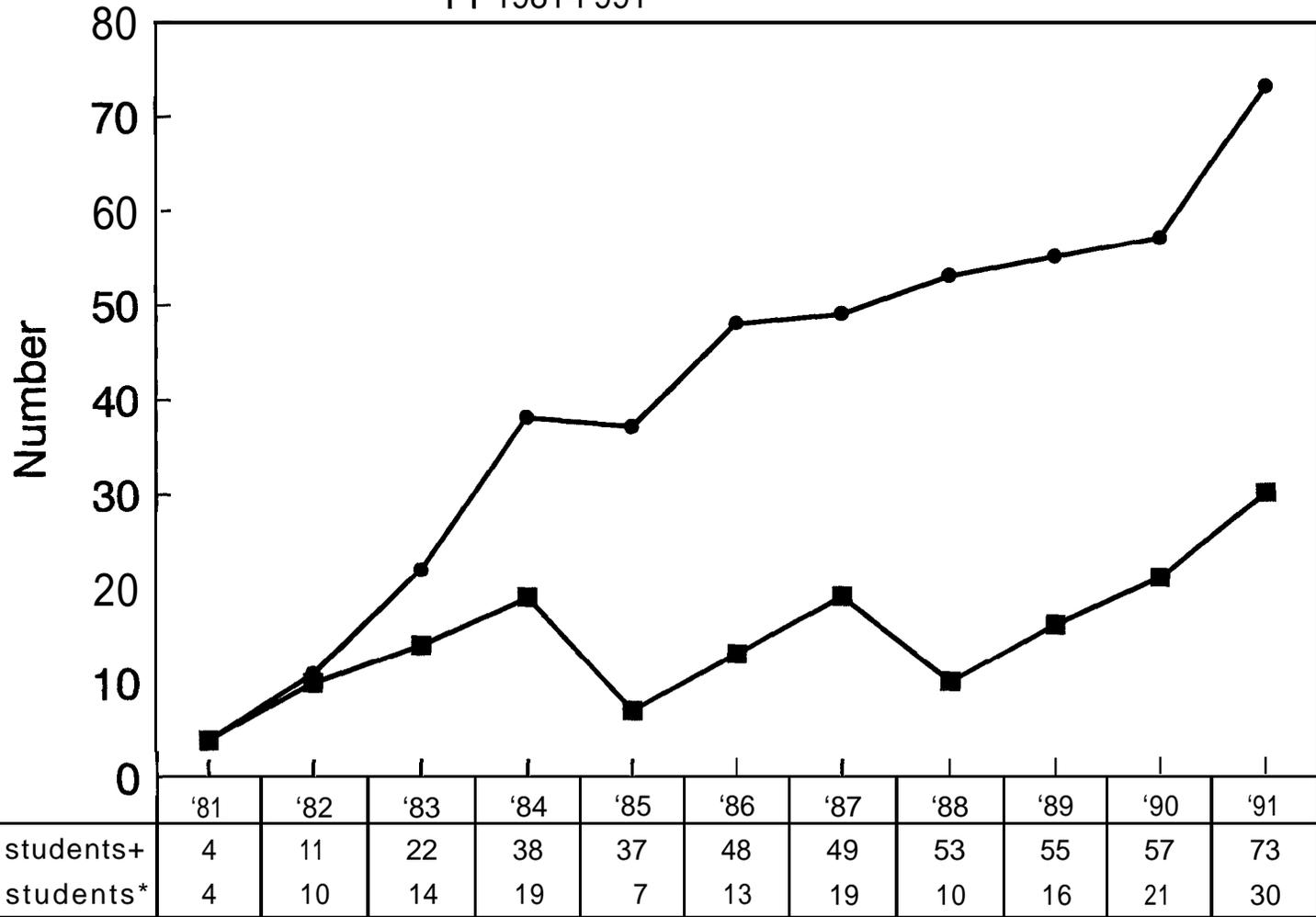
*"Underrepresented minorities" shown in this figure: Native Americans, Hispanics, and African Americans.

Note: Data represent students who received MARC support and were found in the Doctorate Records Pile. These Ph.D. recipients were all from a cohort of 1,294 MARC students who received support for 1 to 2 years from 1977 through 1994. There may be errors in records or missing data, resulting in underreporting.

Data source: NIGMS.

Figure 22

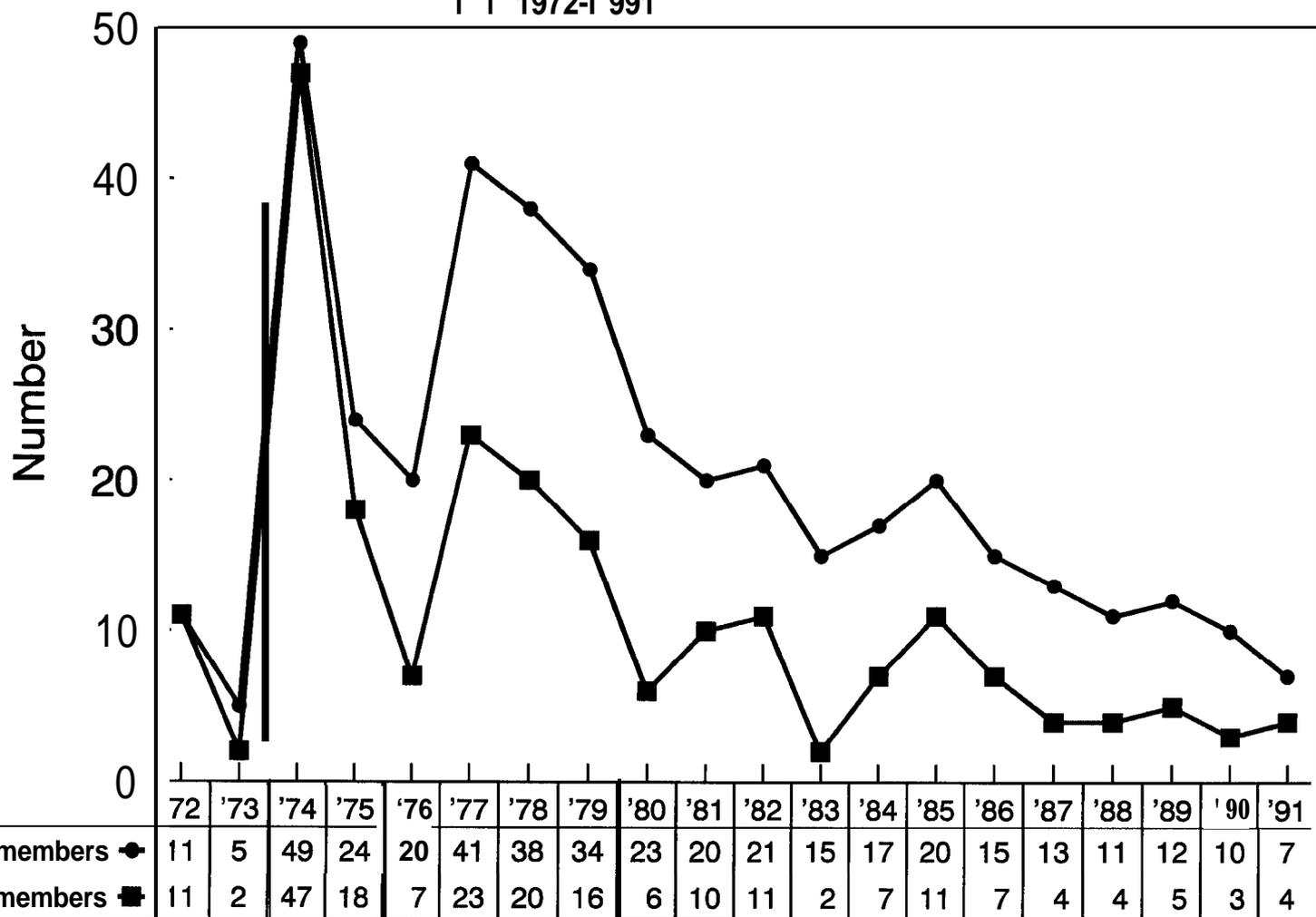
NIH Minority Access to Research Careers (MARC) Program
 Traditional Predoctoral Fellowship Program
 (MARC F31 Fellowships)
 Number of Students Supported
 FY 1981-1991



Note: A cumulative total of 163 predoctoral students received MARC support for varying periods of time from 1961 through 1991.

Data source: NIGMS.

Figure 23
NIH Minority Access to Research Careers (MARC) Program
Faculty Fellowship Program
(F34 Fellowships*)
Number of Faculty Supported
FY 1972-1 991

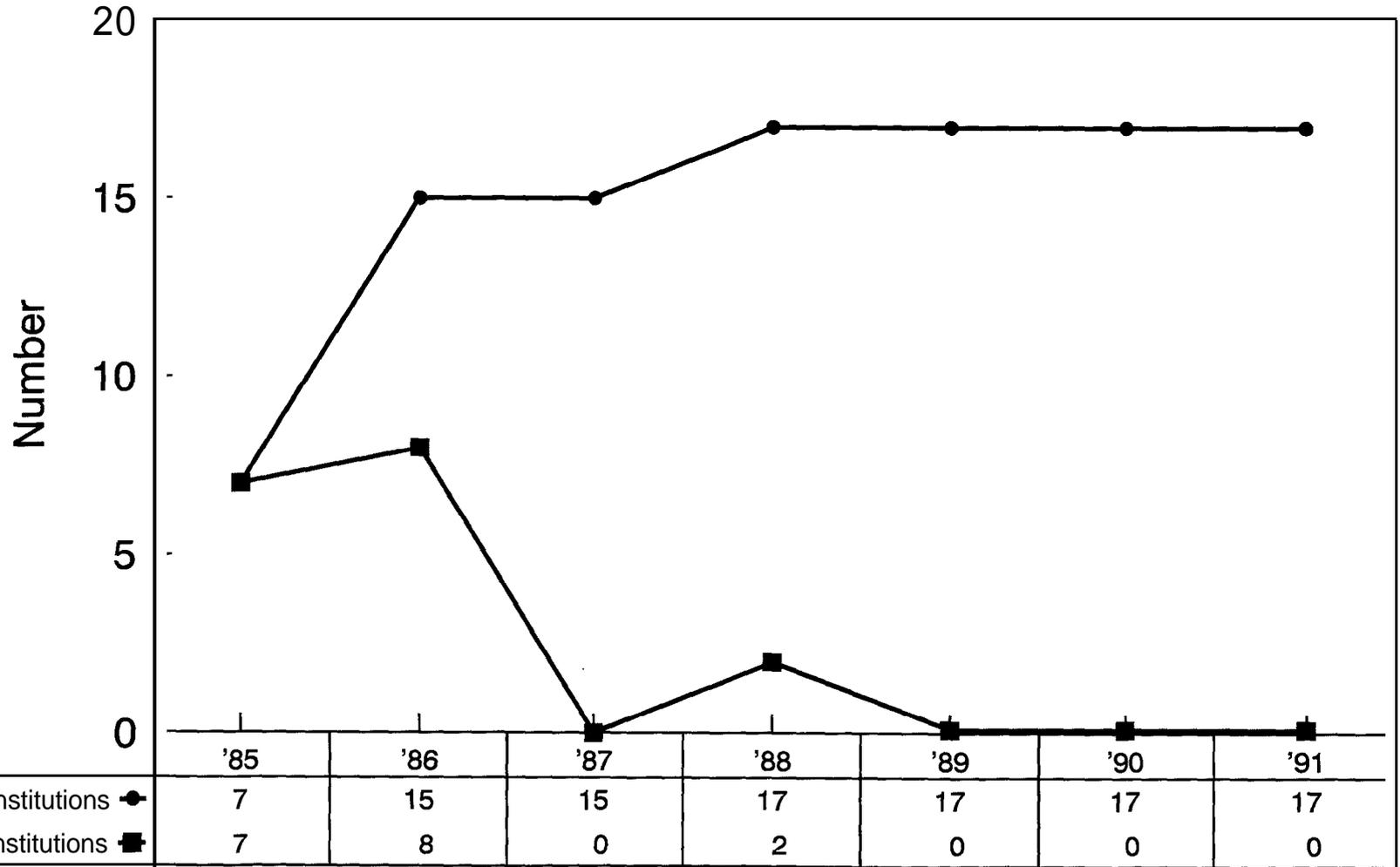


*Including MARC F14 faculty fellowships, which were replaced by F34 faculty fellowships in 1975.

Note: A cumulative total of approximately 218 faculty members received MARC support for varying periods of time from 1972 through 1991.

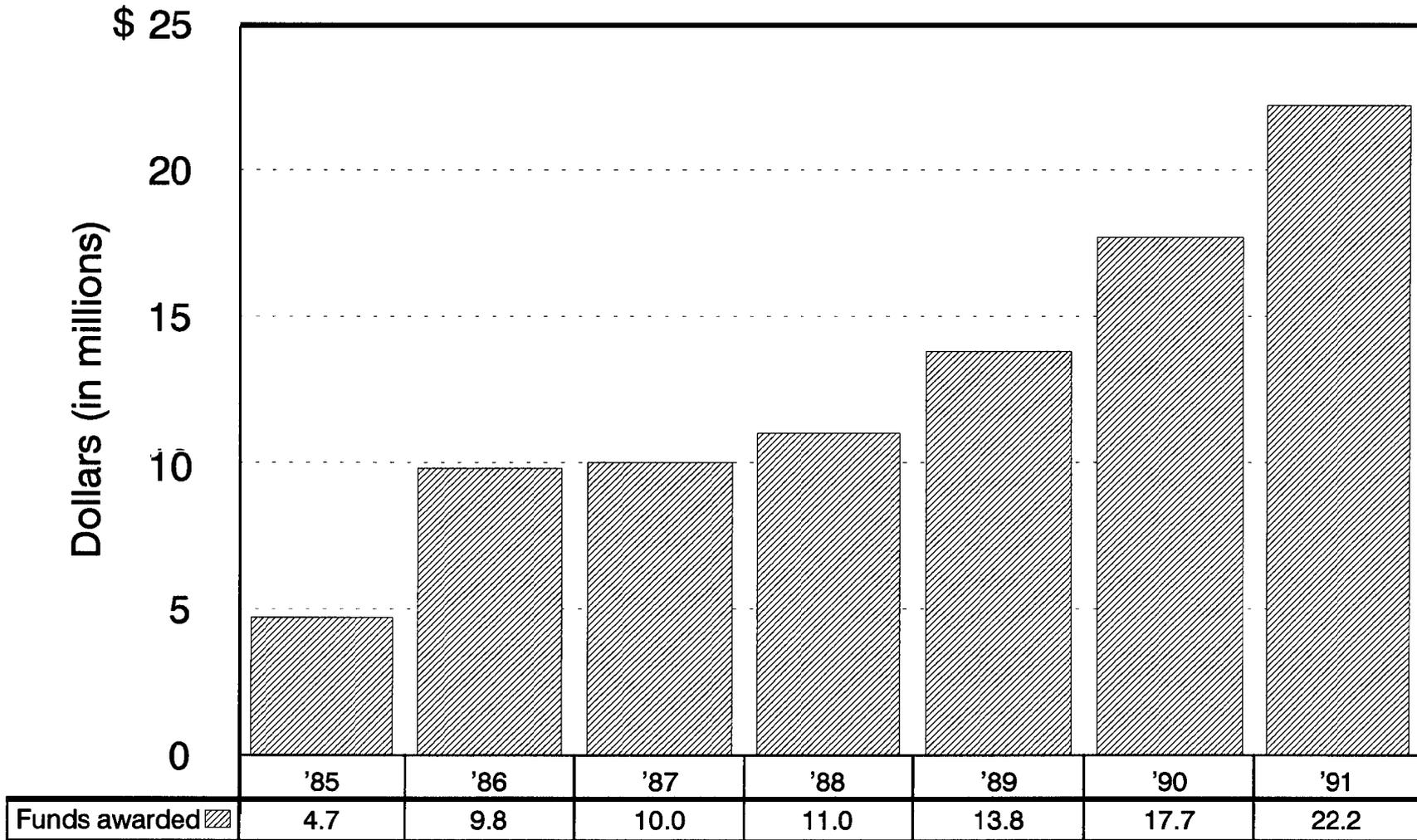
Data source: NIGMS.

Figure 24
 NIH Research Centers in Minority Institutions (RCMI) Program
 (G12 Grants)
 Number of Institutions Supported
 FY 1985-1 991



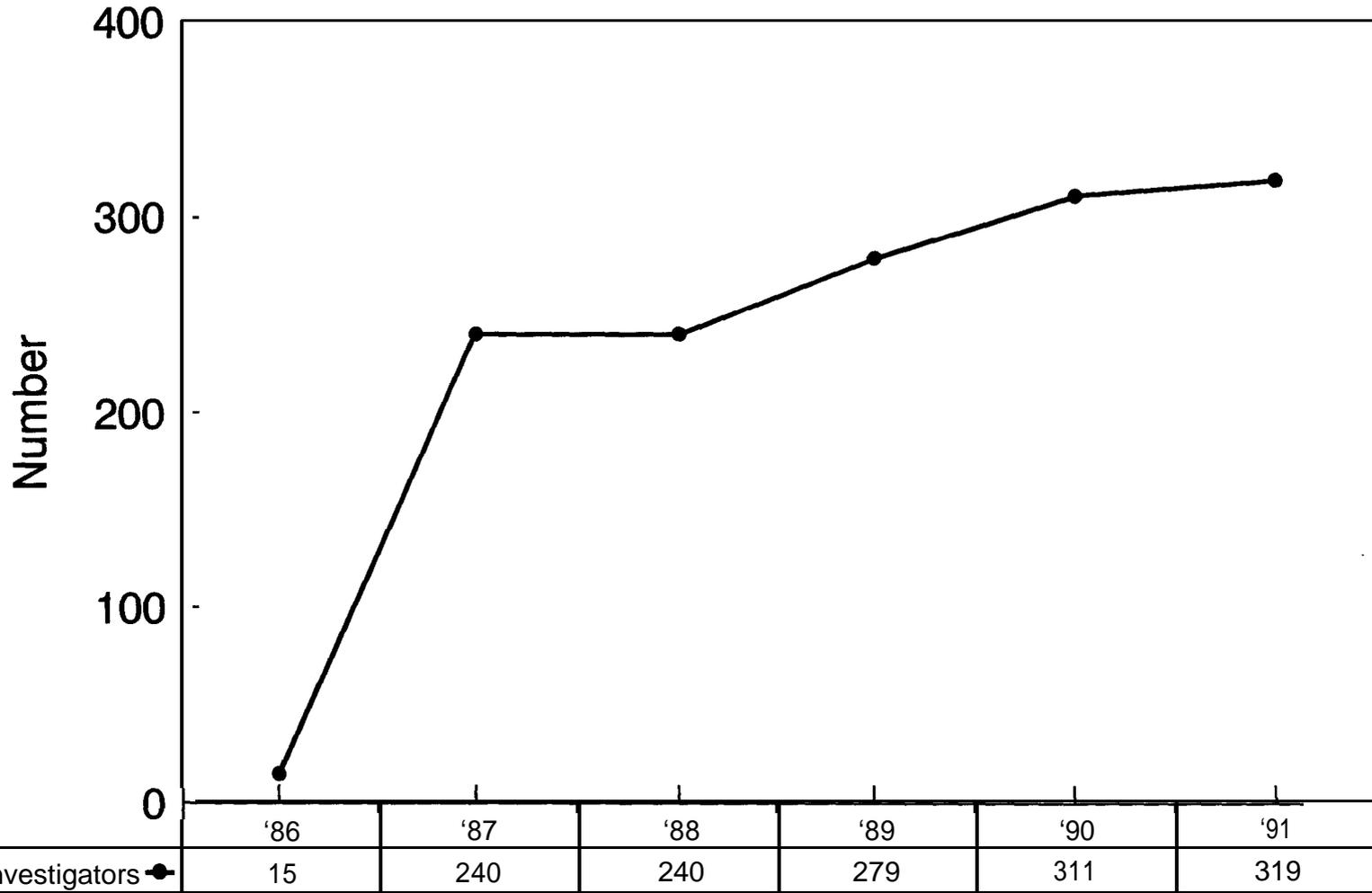
Data source: NCRR.

Figure 25
 NIH Research Centers in Minority Institutions (RCMI) Program
 (G12 Grants)
 Total Amount of Support
 FY 1985-1991



Data source: NCRR.

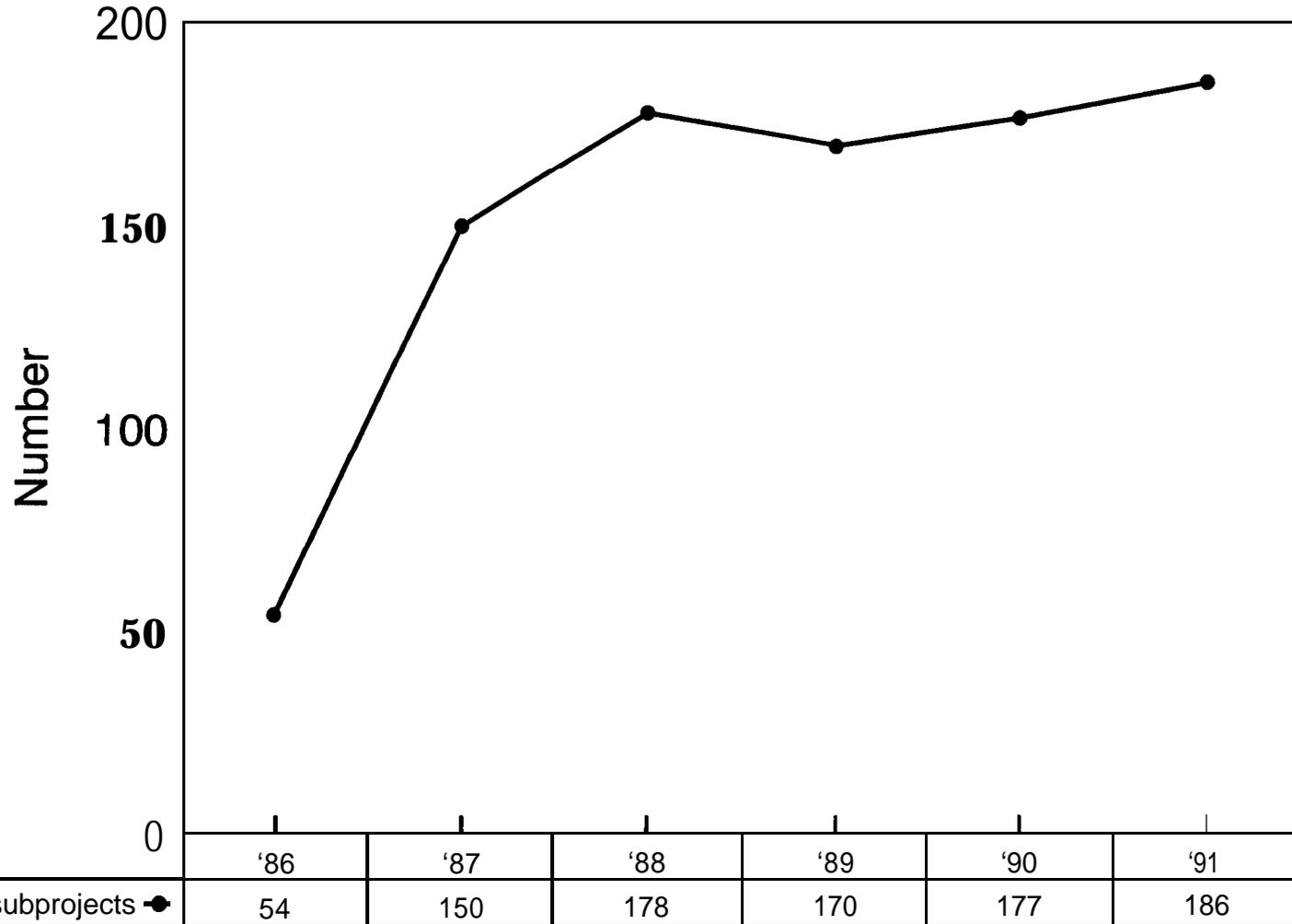
Figure 26
 NIH Research Centers in Minority Institutions (RCMI) Program
 (G12 Grants)
 Number of Scientific Investigators Supported
 FY 1986-1 991



Note: A cumulative total of approximately 657 scientific investigators received RCMI support for varying periods of time from 1988 through 1991.

Data source: NCRR.

Figure 27
 NIH Research Centers in Minority Institutions (RCMI) Program
 (G12 Grants)
 Number of Subprojects Supported
 FY 1986-1 991



Note: A cumulative total of approximately 416 scientific research subprojects were supported by RCMI for varying periods of time from 1986 through 1991.

Data source: NCRR.

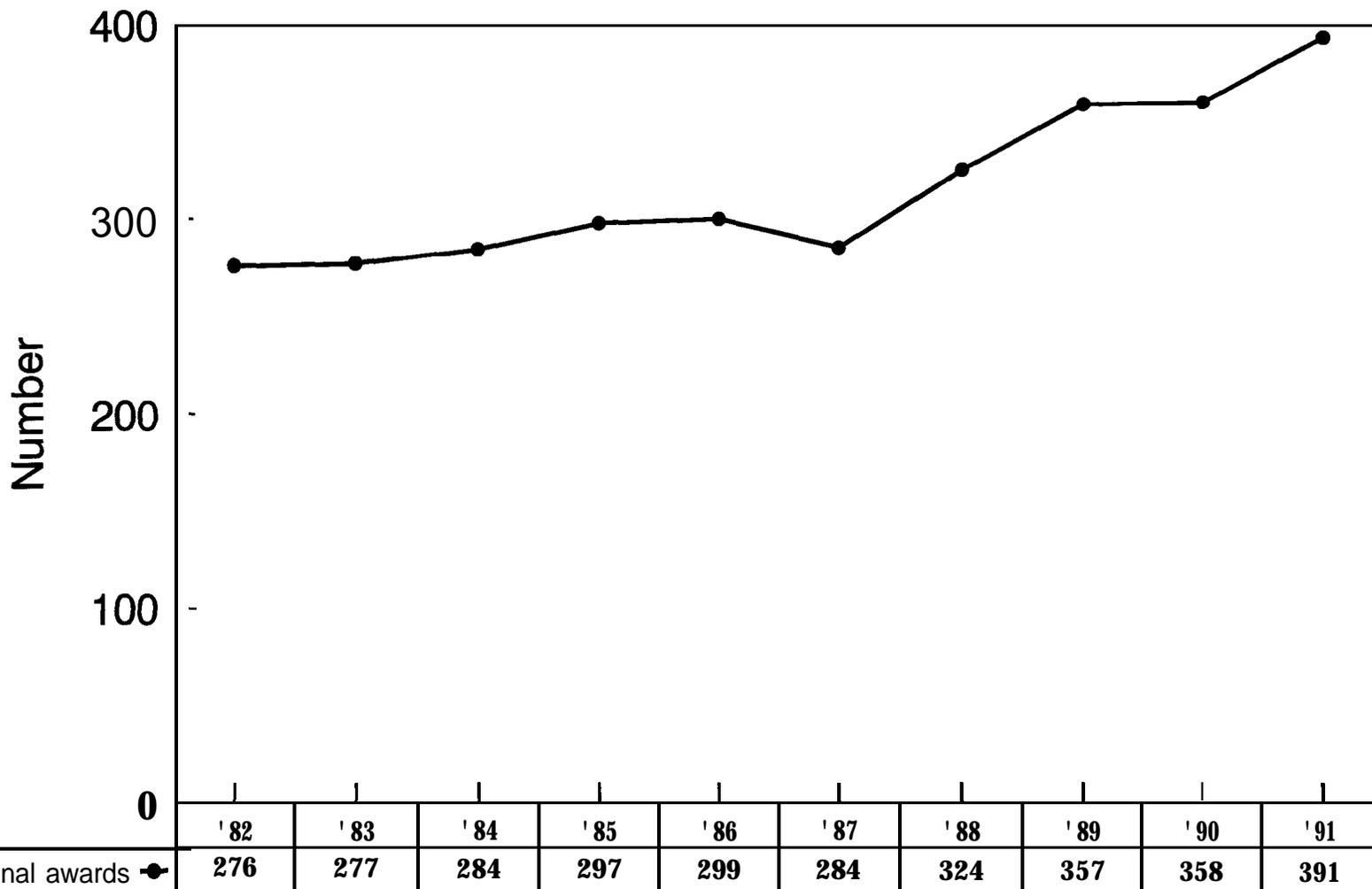
Figure 28

NIH Minority High School Student Research Apprenticeship Program (MHSSRAP)

(SO3 Grants)

Number of Institutional Awards

FY 1982-1991



Data source: NCRR.

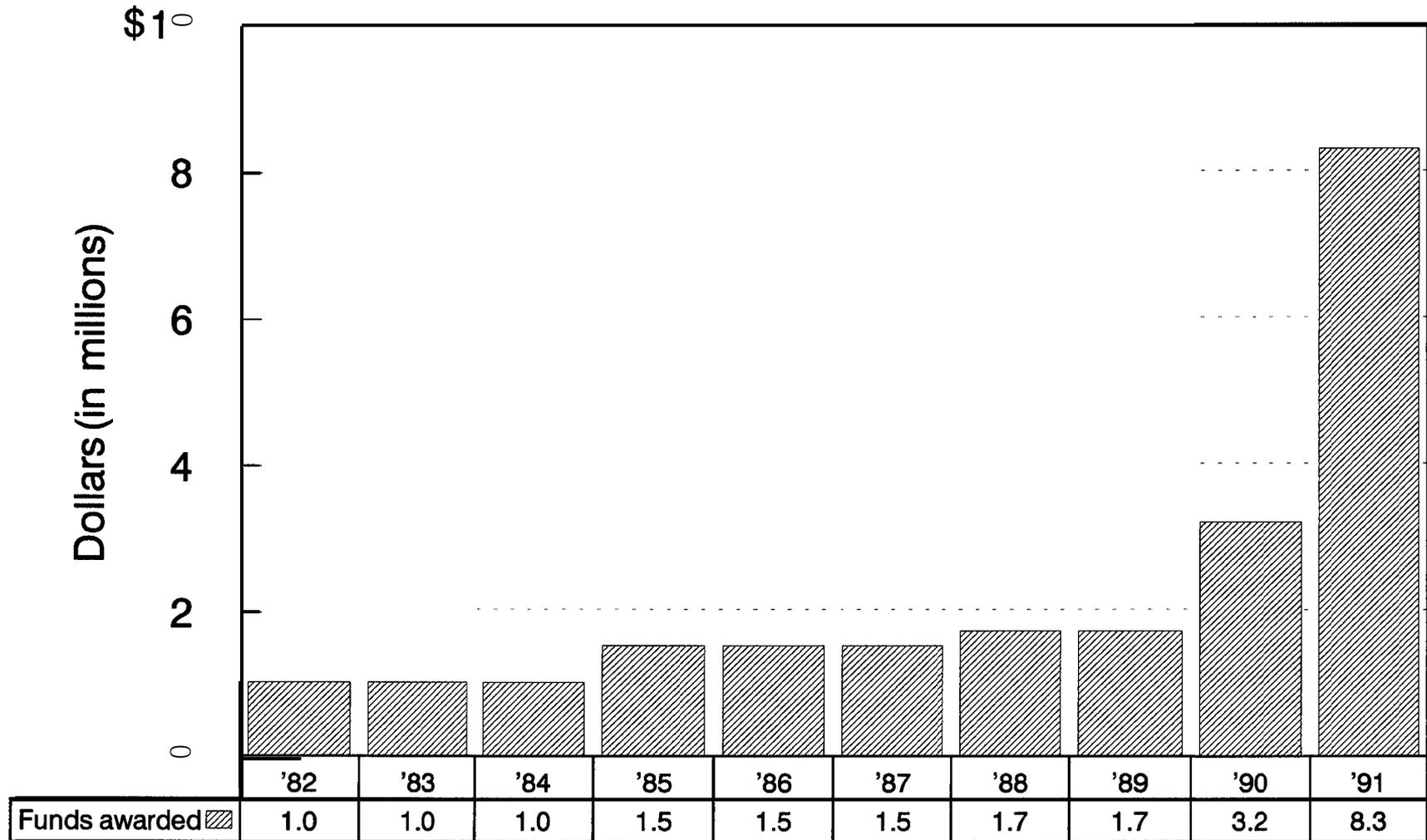
Figure 29

NIH Minority High School Student Research Apprenticeship Program (MHSSRAP)

(S03 Grants)

Total Amount of Support

FY 1982-1991



Data source: NCRR.

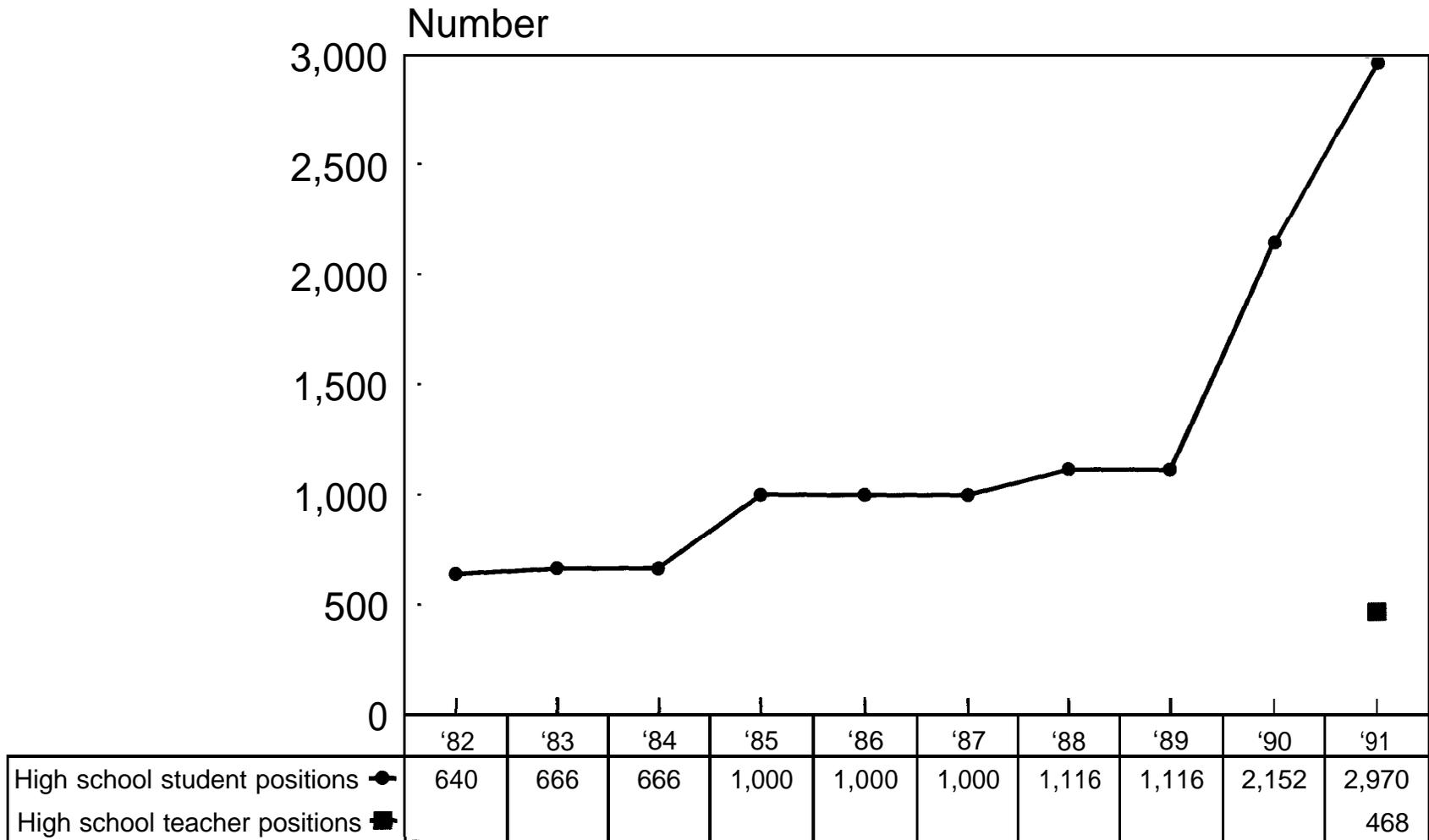
Figure 30

NIH Minority High School Student Research Apprenticeship Program (MHSSRAP)

(SO3 Grants)

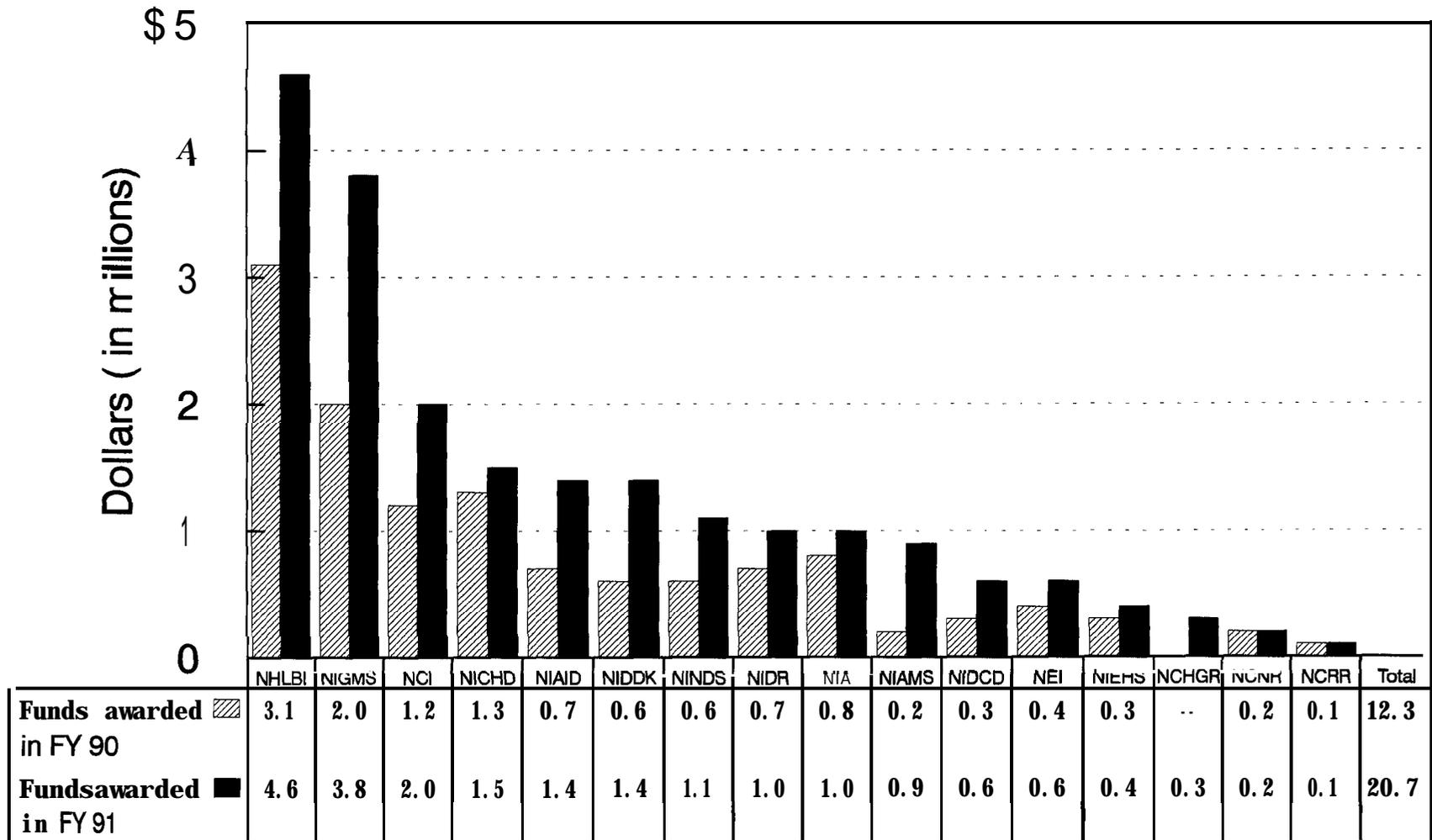
Number of Student and Teacher Positions Supported

FY 1982-1991



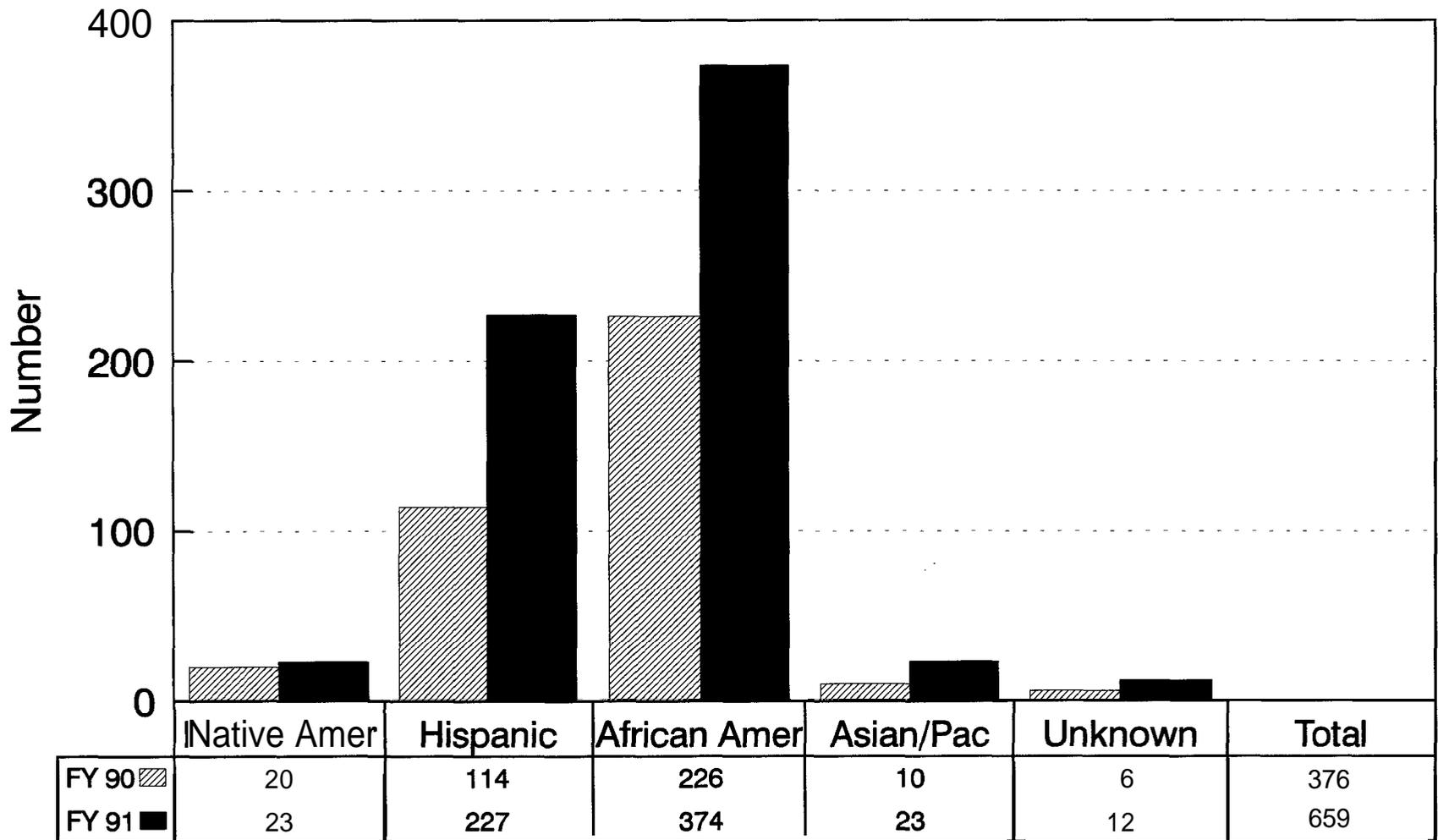
Data source: NCRR.

Figure 31
 NIH Research Supplements for Underrepresented Minorities
 Total Amount of Support
 by Institute or Center
 FY 1990-1991



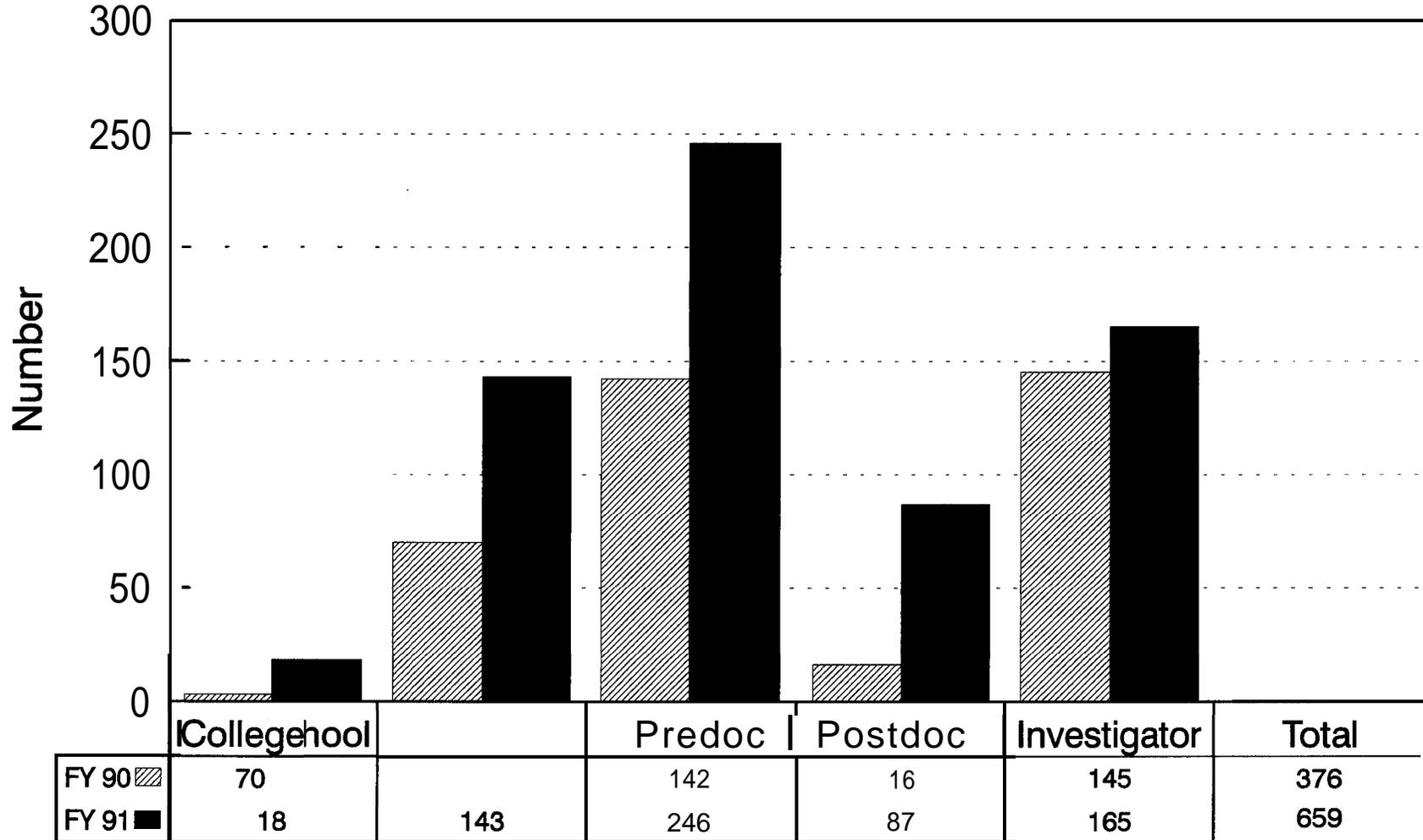
Data source: OER.

Figure 32
 NIH Research Supplements for Underrepresented Minorities
 Number of Individuals Supported
 by Racial/Ethnic Group
 FY 1990-1991



Data source: OER.

Figure 33
 NIH Research Supplements for Underrepresented Minorities
 Number of Individuals Supported
 by Career Level
 FY 1990-1991



Data source: OER.

SECTION 4:

LIMITATIONS OF CURRENT NIH DATA COLLECTION PROCEDURES

As mentioned previously in this report, past and current NIH data collection procedures do not permit comprehensive analyses of the impact of different NIH minority research/training programs on participating individuals' academic and career pathways. To address this problem, the NIH Minority Programs Evaluation Committee recommends that a trans-NIH system be designed for tracking individuals who receive research/training support so that programs can be effectively evaluated with regard to their success in achieving their programmatic objectives and long-term goals. The system should be specifically designed to capture the race/ethnicity of individuals receiving research/training support, distinguishing Asians from Pacific Islanders. It should also include, whenever possible, personal identifying information (i.e., name, Social Security number, gender, date of birth, and permanent address) so that a variety of analytic databases can be linked to track the academic and career paths of individuals who receive NIH research/training support effectively. Relevant information that is currently collected by various components of the NIH and limitations of the present system are presented in this section.

PHS FORM 398

A principal investigator or program director submitting an application for an NIH research grant usually is required to use the standard Public Health Service grant application form (PHS Form 398) and submit the application to the NIH Division of Research Grants (DRG), where key information on the application form is entered into the central NIH grant database, known as the Information for Management, Planning, Analysis, and Coordination (IMPAC) system. The application is then assigned to the most appropriate ICD and Initial Review Group (IRG), often called a study section, for peer review based on scientific merit.

Since 1981, PHS Form 398 has included a page containing questions on the race/ethnicity, gender, and date of birth of the principal investigator/program director. The applicant is asked to check one of the following race and/or ethnic origin categories: American Indian or Alaska Native, Asian or Pacific Islander, Black (not of Hispanic origin), Hispanic, and

White (not of Hispanic origin). The directions for completing this personal data page are as follows: "Upon receipt and assignment of the application by the PHS, this form will be separated from the application. This form will *not* be duplicated, and it will not be part of the review process. Data will be confidential All analyses conducted on the data will report aggregate statistical findings only and will not identify individuals." Responses are recorded only in encrypted form, and personal data are not available to anyone involved in making decisions about awards. Nevertheless, because completion of this page is voluntary, data on race/ethnicity, gender, and date of birth are sometimes missing.

Those who have not responded to the questions on race/ethnicity, gender, or date of birth are termed "nonresponse" applicants or awardees. To use all available data on race/ethnicity and gender, the DRG developed a process that combines records from an investigator's previous applications and grants. Records containing information on race/ethnicity or gender are matched by Social Security number. Non-responding individuals are then categorized by race/ethnicity and gender based on data that may have been submitted by the individual on other NIH applications. This procedure has increased the proportion of NIH research grant applicants whose race/ethnicity is identifiable, from an average of 76 percent to an average of 95 percent over the 10-year period FY 1982 through 1991 (see figure 34). The IMPAC data presented in this report reflect the enriched race/ethnicity data.

Although race/ethnicity of the principal investigator/program director is requested on PHS Form 398, race/ethnicity information is not requested for other individuals participating in the scientific execution of the research project, including collaborating investigators, junior investigators, and support staff. However, personal identifying information needed to link NIH research grant applicants with other NIH records is currently collected on PHS Form 398 for both the principal investigator (name and Social Security number) and the other personnel to be engaged on the project (name, Social Security number, and date of birth). Currently, this information on other personnel appears on the grant application but is not captured in the central DRG information system.

One limitation of the present IMPAC system is that the sponsoring ICD receives no race/ethnicity information on

either the principal investigator or other personnel engaged on the project. However, ICD's can request from the DRG aggregate race/ethnicity data for principal investigators and thereby compare overall trends through time. In addition, two files that are created from the IMPAC system, the NIH Consolidated Grant Applicant File (CGAF), and the NIH Trainee and Fellow File (TFF), provide information on race/ethnicity and can be accessed by authorized users within any ICD if the ICD has programming support using the SAS System. Although these mechanisms do not constitute a comprehensive tracking system, they are useful in helping ICD's track their progress toward increasing the number of individual grant applications involving underrepresented minority investigators.

PHS Form 398 is used to apply for nearly all new NIH research grants, competing continuations, and research training grants, including initial applications for Institutional NRSA's. Four other forms are used by the NIH for certain types of grant applications and appointments-specifically, PHS Forms 2590, 416, 6246, and 2271.

PHS FORM 2590

PHS Form 2590 is used to apply for a noncompeting continuation grant, generally a year of continued support for an existing grant that has been previously peer reviewed and recommended for multiple-year support. These applications do not undergo additional peer review but are administratively reviewed by the awarding ICD after key information on the application form has been entered into the IMPAC system by DRG staff. In the progress report section of Form 2590, personal identifying data (name, Social Security number, and birth date) are requested for all current and planned personnel involved in the project. However, race/ethnicity data are not currently collected for project personnel (although race/ethnicity summary data must be submitted for patients or other research subjects enrolled in the study). Additional information is required in the case of a noncompeting continuation of an Institutional NRSA. In addition to requesting personal identifying information (name and Social Security number) for each trainee supported during the current budget period, the program director is asked to provide a summary of the racial/ethnic distribution of all trainees supported during the period, using the following categories: American Indian or Alaska Native, Asian or Pacific Islander, Black, Hispanic, and White. At the present time, personal identifying information collected on Form 2590

is sent directly to the ICD and therefore is not computerized centrally by DRG staff.

PHS FORM 416

PHS Form 416 is used to apply for both new and noncompeting continuations of Individual NRSA's, which are fellowships available at the predoctoral, postdoctoral, and senior levels and provide a stipend to the awardee. The MARC Predoctoral and Faculty Fellowship programs and the new Predoctoral Fellowship Awards for Minority Students Program are three types of Individual NRSA's that have been specifically designed to encourage underrepresented minorities to obtain advanced research training in the biomedical sciences. Awardees of all Individual NRSA's are subject to NRSA payback provisions that require 1 year of biomedical or behavioral health-related research and/or health-related teaching, or an acceptable combination thereof, for each year of support in excess of the initial year. Personal identifying information (name, Social Security number, and permanent mailing address) of the individual requesting support is included on the initial application form, and this information is computerized by DRG staff. The primary purpose of collecting this information is to help track awardees after their period of NIH support has ended to see if they have fulfilled their payback service requirements. As with PHS Form 398, since 1981 a Personal Data page has been included as part of PHS Form 416, which contains questions on the race/ethnicity, gender, and birth date of the fellowship applicant. This page is separated from the application upon receipt after the information is computerized in encrypted form, and the race/ethnicity, gender, and birth data of the applicant are not available to ICD's or individuals involved in making decisions about awards.

PHS FORM 6246

PHS Form 6246 is used to apply for SBIR Program grants that are intended to support the development of R&D ideas that may lead to commercial products or services. One of the goals of the SBIR Program is to foster and encourage participation by minority and disadvantaged persons in technological innovation, with the definition of a minority and disadvantaged individual being a member of any of the following groups: Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, and Subcontinent Asian Americans. Applicants are asked to check a box on Form 6246 indicating that the organization is a "minority and disadvantaged" small business concern, as defined by the Small Business Administration, but the form does not include

any questions on the specific race/ethnicity of individuals involved in the research project or business.

PHS FORM 2271

In addition to the above-mentioned information that is submitted to NIH as part of an initial grant application or an application for a continuation of an award, personal identifying information and race/ethnicity data are also collected on a "Statement of Appointment" form (PHS Form 2271) after an award has been made. PHS Form 2271 is required for each new appointment, reappointment, and amended appointment of an individual receiving monetary support as a trainee under an NIH institutional training grant (including each MARC-supported trainee) or as an appointee under a career development program award in which the institution selects and appoints the individual. This form, which is signed by both the individual and the program director, must be completed and submitted to the NIH at the time the individual starts the appointment or reappointment. Personal identifying data (name, Social Security number, date of birth, gender, and permanent mailing address) are requested. Race/ethnicity was added to the form in September 1991. Appointees are now asked to choose which one of the following categories that best describes their racial/ethnic status: American Indian or Alaska Native, Asian (not a Pacific Islander), Black (not of Hispanic origin), Hispanic, White (not of Hispanic origin), and Pacific Islander. In keeping with NIH policy, race/ethnicity information is encrypted, and all analyses conducted on the data are aggregated when statistical findings are reported, with no identification of individuals. A clear advantage of the race/ethnicity data collected on PHS Form 2271 is that Asians and Pacific Islanders are not grouped together, permitting separate analyses to be conducted on Pacific Islanders, a minority group currently underrepresented in biomedical research. Unfortunately, Asians and Pacific Islanders are combined as a single category on the other NIH forms mentioned above.

MHSSRAP SAMPLE
REPORT FORMS

To obtain information on students and teachers supported under the MHSSRAP, sets of sample report forms are sent to the program directors to help them complete progress reports that must be submitted at the end of each summer session. Requested information includes a summary of the race/ethnicity distribution of the minority high school students who received support and a similar summary for high school teachers supported under the grant, using the following

categories: American Indian, Asian/Pacific Islander, Black (not of Hispanic origin), Hispanic, and Other minority. In addition, personal identifying information is requested for each supported student (name, Social Security number, and gender but not race/ethnicity) and each supported science teacher (name, address, Social Security number, date of birth, gender, and race/ethnicity). Science teachers are also asked to provide qualitative assessments of the Minority High School Program, including information that should prove to be quite useful in future evaluations of the program. Unfortunately, only a small portion of the information submitted on progress reports has been computerized to date, due to budget constraints.

ADDITIONAL LIMITATIONS

In addition to the Asian/Pacific Islander problem, which would appear to be relatively easy to address by modifying the racial/ethnicity checklist on NIH grant application forms, there are other problems with the current data collection system that make it quite challenging to track under-represented minority individuals who have received research/training support from NIH and conduct meaningful program evaluations. For example, the most reliable identifier for tracking individuals through time, the Social Security number, is provided voluntarily and is not a requirement of any NIH research grant application, in keeping with currently approved PHS systems of records falling under the purview of the Privacy Act of 1974 (5 USC 522a). The permanent merging of computerized NIH data files is also currently protected under the Privacy Act. For these reasons, conducting comprehensive evaluations of minority research/training programs may necessitate amending one or more NIH systems of records currently authorized under the Privacy Act.

Another problem is that a significant amount of useful information is currently collected on the above-mentioned forms but either has not been computerized in the IMPAC system or is only available from files maintained in individual ICD grants program offices. Although there are plans to computerize some of this information centrally in the future, such as data on individuals receiving minority supplements, keying and verifying data using a recommended double entry procedure is labor intensive, and budget constraints have played a role in delaying the process.

Despite the above-mentioned limitations of current NIH data collection procedures, the Planning and Policy Research

Branch, Office of Science Policy and Legislation, NIH, has developed innovative ways to temporarily link data contained in different NIH computerized databases such as DRG's IMPAC system, the NIH Trainee and Fellow File (TFF), the NIH Consolidated Grant Applicant File (CGAF), the Doctorate Records File (DRF) maintained by the NRC, and the Faculty Roster File maintained by the AAMC to obtain additional information on minority investigators (see Section 5 for the results of these evaluations). Unfortunately, their evaluations to date have been necessarily retrospective in nature and have been limited to grant applicants (excluding NIH-supported trainees and other project personnel), due in large part to the data collection and computerization problems cited above.

The recently approved NIGMS study to evaluate the MARC Honors Undergraduate Research Training Program is designed to be a comprehensive evaluation study that will address many of the problems mentioned above. A great deal of planning has been done in preparation for this important study. Surveys of current and former trainees, MARC faculty, and MARC Program directors will be conducted to augment the limited information that is currently available from competing grant applications and other source documents. The objectives of the evaluation are to collect detailed information on the characteristics of MARC trainees and trainee selection practices, to gather information on how programs have been implemented at different MARC institutions, to assess the effects that the MARC Honors Program has had on the grantee institutions, to evaluate the educational and career progress of former MARC trainees, and to assess whether observed program outcomes are directly attributable to the MARC Program by comparing MARC trainees with non-MARC minority students. More detailed information on the NIGMS study is presented in Section 5.

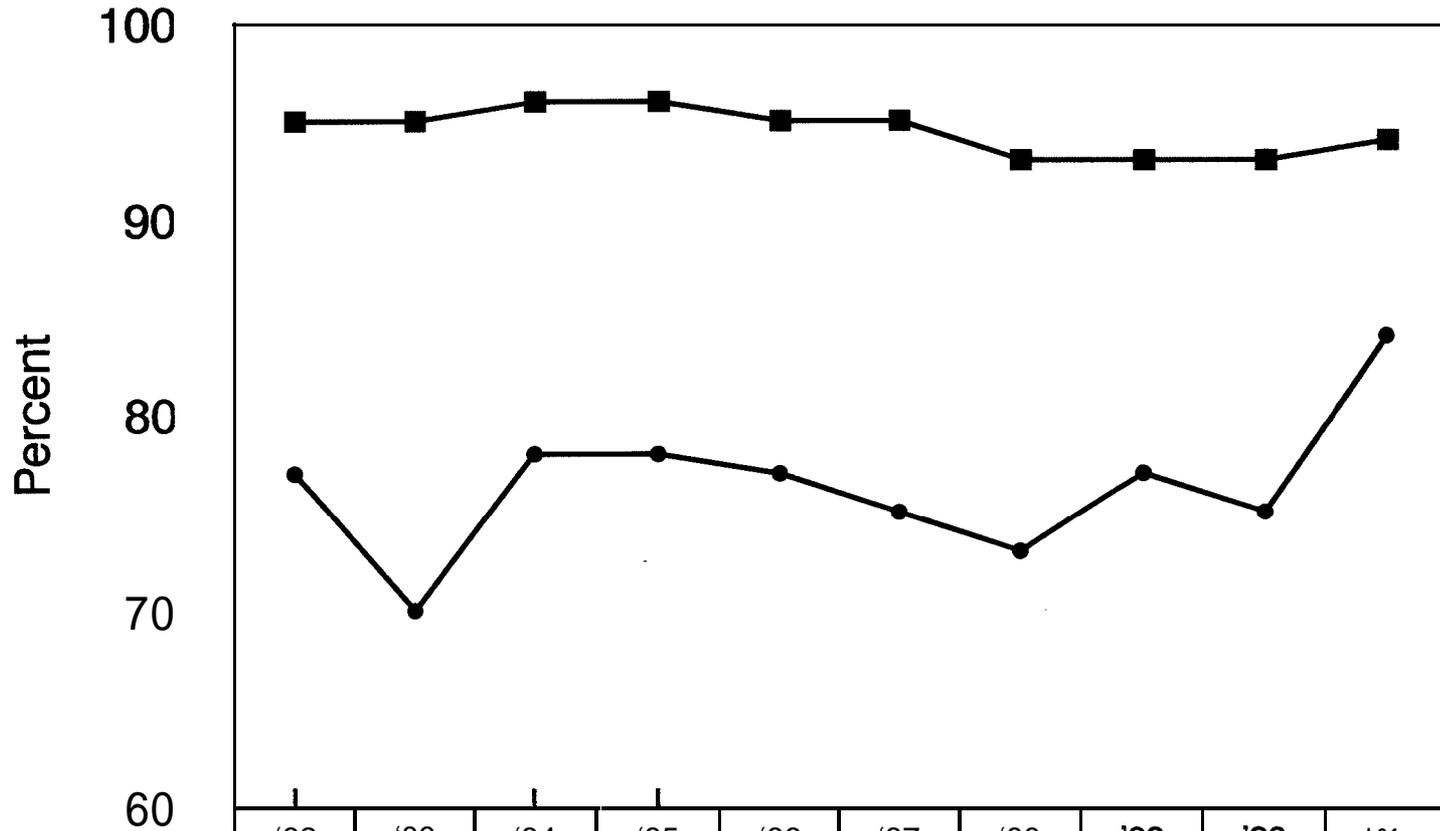
The NIH Minority Programs Evaluation Committee recognizes that the information obtained from the NIGMS evaluation study will have NIH-wide applicability for improving other NIH research/training programs, particularly those aimed at increasing the participation of underrepresented minority students in biomedical and behavioral research careers. The NIGMS study, however, is focused on only one program, the MARC Honors Undergraduate Research Training Program. The Evaluation Committee proposes that a broader, more

comprehensive evaluation be developed and conducted to provide feedback on a routine basis to NIH administrators responsible for the various NIH minority programs.

Figure 34

Competing Applications* of NIH Research Grants
(R, M, K, S, U, P, D42, G12 Applications)

Response Rate to Question on Race/Ethnicity of Principal Investigator
FY 1982-I 991



Race/ethnicity provided in current grant application ●

Race/ethnicity provided in current or previous grant applications ■

	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91
Race/ethnicity provided in current grant application	77%	70%	78%	78%	77%	75%	73%	77%	75%	84%
Race/ethnicity provided in current or previous grant applications	95%	95%	96%	96%	95%	95%	93%	93%	93%	94%

* Excludes small business SBIR (R43/R44) applications.

Data source: IMPAC.

SECTION 5: OTHER STUDIES OF NIH MINORITY RESEARCH/TRAINING PROGRAMS

While this report constitutes the beginning of the first comprehensive, NIH-wide assessment of minority research/training programs, there have been previous evaluations of individual programs both by organizations outside of the NIH as well as staff within the Institutes. In addition, some ICD's are currently conducting or planning to conduct evaluations of a specific program.

The reports and activities cited below are major reports or efforts to assess NIH research/training programs-including minority programs-that have been widely disseminated or have been brought to the attention of the NIH Minority Programs Evaluation Committee. It should be noted that evaluation activities vary from Institute to Institute depending on the expertise of staff and the size of the programs. In many cases, ICD's conduct evaluations but maintain no central repository for this information. Reports conducted for program directors or advisory councils are often routine and may not have been considered "evaluations" by ICD staff; thus these are not included here. The following reports/activities are discussed in this section:

REPORTS OF THE COMMITTEE ON NATIONAL NEEDS FOR BIOMEDICAL AND BEHAVIORAL RESEARCH PERSONNEL OF THE INSTITUTE OF MEDICINE

- ◆ *Minority Access to Research Careers: An Evaluation of the Honors Undergraduate Research Training Program, 1985.*⁴
- ◆ *The Career Achievements of NIH Predoctoral Trainees and Fellows, 1984.*⁵
- ◆ *The Career Achievements of NIH Postdoctoral Trainees and Fellows, 1985.*⁶

- ◆ *Biomedical and Behavioral Research Scientists: Their Training and Supply, 1989.*²

DOCUMENTS THAT INCLUDE A REVIEW OF THE STATUS OF MINORITIES IN BIOMEDICAL RESEARCH

- ◆ *Changing America: The New Face of Science and Engineering, September 1988.*⁷
- ◆ *Investing in Human Potential, 1990-91: Science and Engineering at the Crossroads, 1991.*⁸
- ◆ *Career Paths for Clinical Research, IOM; due to be published in March 1993.*

NIH EVALUATION ACTIVITIES

- ◆ *Report of the Task Force for the Review of NIH Biomedical Research Training Programs, October 1989.*
- ◆ **Assessment of the Status of the Minority Faculty Development Award Program, NHLBI, February 1992.**
- ◆ *Report and Recommendations of the Ad Hoc MBRS Advisory Group, NIGMS, 1992.*
- ◆ **MBRS and MARC HURT Data Matches to NRC-DRF, AAMC and ADA Files.**
- ◆ **NIGMS Evaluation of the Minority Access to Research Careers (MARC) Honors Undergraduate Research Training Program.**
- ◆ **Establishment of an Analytic Database To Assess Staffing Patterns on NIH Grants.**
- ◆ **Assessment of Data Quality and Accuracy of the Trainee Applicant File and the Trainee and Fellow File.**

REPORTS OF THE COMMITTEE ON NATIONAL NEEDS FOR BIOMEDICAL AND BEHAVIORAL RESEARCH PERSONNEL OF THE INSTITUTE OF MEDICINE

The following four reports were written at the request of the NIH, under the auspices of the Committee on National Needs for Biomedical and Behavioral Research Personnel (the Committee) of the National Research Council (NRC), Institute of Medicine (IOM). The Committee was formed in early 1975, first under the aegis of the Commission on Human Resources of the National Academy of Sciences and later under the auspices of the IOM. It was replaced in 1986 by the IOM Committee on Biomedical and Behavioral Research Personnel. The Committee's primary mission was to project the demand for research personnel and, subsequently, to make recommendations for Federal training programs based on that demand.

1985 REPORT ON MINORITY ACCESS TO RESEARCH CAREERS: AN EVALUATION OF THE HONORS UNDERGRADUATE RESEARCH TRAINING PROGRAM

At the request of the NIGMS, the Committee undertook an evaluation of the largest component of the MARC Program, the Honors Undergraduate Research Training Program. The study consisted of site visits to five MARC training programs and a survey of all the former trainees. The Committee looked at the following outcomes: graduate study in the biomedical sciences, earned doctorates, careers in science, and institutional change.

The MARC Honors Program began in 1977 with 74 trainees at 12 schools. By 1984, there were 389 trainees at 56 undergraduate institutions and approximately 800 program alumni. At the time of the report, there were no administratively collected data on race or ethnicity of MARC trainees. Between 1978 and 1984, 677 trainees graduated while supported by the program. It was reported that 108 trainees left the program before graduation; many of these students graduated later with a B.S. degree from MARC grantee institutions or other schools.

Former MARC trainees were surveyed for information on their educational and career achievements. The response rate was 65 percent (498 former trainees and 36 students in the MARC Honors Program at the time of the survey). Data from NIH training records and MARC Honors grant renewal applications were used to compare respondents with

nonrespondents. More recent participants were slightly more likely to respond than less recent participants. Respondents had slightly higher GPA's and were more likely to have received NIH predoctoral fellowships.

The relatively short period of time from the graduation of the first MARC cohort (1978) until the evaluation (1984) limited the number of students who reported they were able to complete graduate work. About 76 percent of all former MARC trainees stated that they had matriculated as students in a graduate or a professional school program. From the first three graduating cohorts, 22 trainees had received their doctorate degrees; 21 of those degrees were professional (M.D., D.D.S., or D.V.M.) and one was a Ph.D. At the time of the survey, 65 percent of the respondents were students, and 17.3 percent were enrolled in research doctorate programs.

The evaluation used three key measures of program success—doctoral enrollment (or completion), doctoral progress, and doctoral plans. Of the total respondents, 47.6 percent were considered doctoral enrollees. Adding the master's degree seekers (15 percent) raised the percentage of potential doctoral progress to 62.7 percent. Including those planning doctoral degrees, the number of qualified respondents was 82.1 percent. One of the conclusions of the report was that “the survey did not reveal any serious deficiencies in the MARC Honors Program.”

EDUCATIONAL STATUS OF FORMER MARC HONORS STUDENTS
RESPONDING TO SURVEY (1984)

<u>Educational Status</u>	<u>Number</u>	<u>Percent</u>
Completed Ph.D.	1	0.2
Completed M.D., D.D.S., D.V.M.	21	4.2
Enrolled Master's	75	15.1
Enrolled Research Doctorate	86	17.3
Enrolled Professional Doctorate	126	25.3
Enrolled Other Professional Degree	3	0.6
Enrolled M.D. /Ph.D.	3	0.6
Other Students	29	5.8
Left Graduate School Without Degree	84	16.9
None of the Above	<u>70</u>	<u>14.0</u>
Total Respondents	498	100.0

Students reported a high level of satisfaction with the MARC Honors Program in general and with the research component in particular. National figures also indicate that compared with students nationwide, the percentage of biology majors increased at MARC schools.

Given the short time between the start of the MARC Honors Program and the evaluation, there were few data available to examine outcomes. The report provides a valuable snapshot, however, of the 800 alumni in 1985. A limitation of the study is the lack of a comparison group. The Committee had proposed surveying a comparison group from the population of honors students in the same departments, schools, and class years as the trainees, but the OMB disapproved the survey of the comparison group on the grounds that the groups were not adequately matched. The Committee challenged the decision but time did not allow for a formal appeal. Another shortcoming of the report is the lack of conclusions or policy recommendations. While the report stated that no serious deficiencies in the program were apparent, it also highlighted few strengths of the program.

The NIGMS plans to conduct a more thorough evaluation of the MARC Honors Program. The details of its proposal are outlined later in this section.

**1984 REPORT ON THE
CAREER ACHIEVEMENTS
OF NIH PREDOCTORAL
TRAINEES AND FELLOWS**

This study was initiated by the Committee in consultation with the NIH. The purpose of this study was to examine the extent to which NIH-supported graduate students have been successful in their pursuit of careers in biomedical research. The study sample consisted of recipients who had received at least 9 months of NIH predoctoral support (a total of approximately 24,000 graduates over the 15-year period). They were compared with two groups: (1) Ph.D. recipients whose graduate schools received NIH traineeships, but who did not receive NIH stipends themselves (13,500 graduates) and (2) all other Ph.D. recipients who had never held NIH fellowships or traineeships in graduate school (18,500). The data files used for this evaluation were the NIH Trainee and Fellow File, the NIH Consolidated Grant Applicant File, and the DRF maintained by the NRC. The study cites no ethnic/race-specific data.

Findings showed that the NIH trainees and fellows completed their Ph.D.'s in a shorter time than members of the two comparison groups. Eighty-five percent of the individuals

who received NIH support before 1971 earned their doctorates by 1981. The median number of years to complete the Ph.D. for those on NIH support was 5.9 years. Students attending institutions receiving NIH traineeships completed their Ph.D.'s in 6.3 years, and all other Ph.D. recipients finished their doctorates in 6.5 years. Individuals in the study group were more likely to receive NIH postdoctoral support or to be involved later in their career in NIH-sponsored activities. It was also found that the NIH trainees and fellows had applied for more NIH research grants and were more successful in obtaining them. The NIH-supported group had authored more papers and been cited more often than the comparison groups.

The NIH programs included in the analysis were the Graduate Training Program (T01), the combined Undergraduate and Graduate Training Program (T03), the Medical Scientist Training Program (T05 and T32), the Institutional NRSA (T32), and the Predoctoral Fellowship Award (F01). The report did not compare fellowship recipients with traineeship recipients, although it was speculated that the fellowships may go to superior students. During the study period, there was an appreciable decline in the number of predoctoral awards made annually by the NIH. Some of the decline was due to the phase out of the F01's, but the decline continued after the elimination of this program.

The authors concluded that, based on the evidence examined, the graduates of the NIH predoctoral training programs were highly successful in pursuing careers in biomedical research. It could not be determined if the superior record of achievement by the NIH trainees and fellows could be attributed primarily to the selection process, the training they received, or a combination of both factors.

A clear shortcoming of the report is the lack of any mention of students' race or ethnicity. During the reporting period, T32 grantee institutions did not provide the NIH with information about the race or ethnicity of their individual trainees. This policy was revised at the beginning of fiscal year 1992, however, and grantee institutions must now complete a Statement of Appointment form for each trainee which includes the race and ethnicity of the trainee.

Since 1986, institutions applying for traineeships (T32's) must submit a Minority Recruitment Plan (MRP). The NIH

Training Advisory Committee is currently drafting a questionnaire for the NIH to examine the quality of these plans. Survey questions will include the following: specific procedures used by peer review groups to evaluate MRP's; the rate of applications rejected based on the quality of the MRP; the number of program directors who are asked to revise their MRP and eventually receive funds; and a listing of brochures that have been developed by ICD's to promote the MRP for T32's. The survey should be distributed in late 1992.

**1985 REPORT ON THE
CAREER ACHIEVEMENTS
OF NIH POSTDOCTORAL
TRAINEES AND FELLOWS**

This study, conducted by the Committee at the request of the NIH, compared the research careers of Ph.D.'s and M.D.'s who had received NIH postdoctoral fellowships with the careers of those who did not receive these 'awards. The only demographic data cited in the report are gender and marital status. The data were obtained from a variety of sources: the DRF maintained by the NRC; the Faculty Roster File, a listing of medical school faculty compiled by the AAMC; NIH personnel files; the NIH Consolidated Grant Applicant File; and the NIH Trainee and Fellow File.

The study found that Ph.D. recipients of NIH postdoctoral fellowship appointments had the most distinguished academic backgrounds, followed by NIH traineeship recipients, and non-NIHsupported Ph.D.'s with postdoctoral plans. It was also found that the NIH postdoctoral recipients came from the most highly rated schools, had the most predoctoral publications, and completed their doctoral work in the shortest amount of time.

The M.D.'s receiving NIH support had longer academic careers, more publications, and more citations than M.D.'s whose primary activities were teaching and research but who did not receive NIH postdoctoral funding.

Like the other studies published under the aegis of the Committee, this report does not include recommendations.

**1989 REPORT ON
BIOMEDICAL AND
BEHAVIORAL RESEARCH
SCIENTISTS: THEIR
TRAINING AND SUPPLY**

This report was the first study undertaken by the Committee on Biomedical and Behavioral Research Personnel of the IOM's National Research Council. This new Committee replaced the Committee on National Needs for Biomedical and Behavioral Research Personnel when it was disbanded in 1986 after completing eight reports. The new Committee has placed a greater emphasis on evaluating the merits of training programs and the productivity of individual careers. Unlike

the reports of the previous committee, this study recommends a research agenda for filling gaps in knowledge necessary for policy decisions.

The report summarizes the current labor market for biomedical researchers and also makes predictions about the future supply and demand of professionals, the role of NRSA programs in the educational pipeline, and requirements for accurately assessing the effectiveness of NRSA programs.

The study found that the number of minority scientists has experienced little growth in recent years. Committee members expressed concern that there was an underrepresentation of minorities awarded predoctoral support by the NIH, especially given NIH's commitment to increasing the number of minority researchers.

The Committee was also concerned about the data available to conduct evaluations. Several NIH files were found to be incomplete, including the IMPAC database, the NIH Trainee and Fellow File, and the NIH Consolidated Grant Applicant File.

A strength of this report is that for the first time the Committee provided specific recommendations based on its findings, citing the need for specific increases in NRSA support and further research on which to base future programs. Recommendations included:

- ◆ Identifying factors that facilitate recruitment and retention at all stages of education, specifically the recruitment and retention of women and minorities.
- ◆ Conducting studies of former trainees, with control groups and study populations consisting of cohorts of entrants to graduate school rather than those earning Ph.D.'s. The Committee recommended that the first two programs to be evaluated be the MARC Program and the Medical Scientist Training Program.
- ◆ Improving current data sources in terms of completeness, response rates and biases, identifiers, and inconsistencies between data sets.

A number of commissioned papers accompanied the report. One of these papers was entitled "Evaluating the National

Research Service Award Program: A Review and Recommendations for the Future” by Georgine Pion. One of her conclusions was that all of the constituents of these programs—Congress, the NIH, fellows, trainees, faculty, national groups, societies, and committees—have a need for descriptive and quantitative information about the NRSA programs. The author reviewed evaluations and reports published before 1989, finding that many do not discuss basic demographic details. More problematic, according to the author, is that the accuracy of the demographic characteristics is questionable. There are insufficient data on applicants, and this factor is complicated by the fact that “applicants” may be either individuals or institutions. The author identified a number of gaps in basic evaluative data and in understanding program participation and operation as well as program outcomes and effects. Among the author’s recommendations are:

- ◆ Assessing the quality of the major NRSA databases.
- ◆ Identifying a core set of evaluative data for all programs funded by NRSA.
- ◆ Gathering information on program characteristics and operation.
- ◆ Increasing the attention paid to measuring the full range of program outcomes.
- ◆ Supporting basic research on scientific career development and maturation and dynamics of training.
- ◆ Exploring the feasibility of implementing effectiveness studies.

DOCUMENTS THAT INCLUDE A REVIEW OF THE STATUS OF MINORITIES IN BIOMEDICAL RESEARCH

**1988 INTERIM REPORT
ON CHANGING
AMERICA: THE NEW
FACE OF SCIENCE AND
ENGINEERING**

In 1988, the Task Force on Women, Minorities, and the Handicapped in Science and Technology released its interim report. The Task Force was created by public law to examine the status of women, minorities, and the handicapped in science positions in the Federal Government and in federally

assisted research programs. It was also charged with coordinating existing Federal programs, suggesting interagency programs, and identifying exemplary programs. Finally, the Task Force was to develop a long-range plan to advance opportunities for women, minorities, and the handicapped.

The report is an effort to highlight the issue of **underrepresented** populations in science and engineering. Its recommendations are based on public hearings at which the Task Force heard testimony from a number of interested parties and experts.

The goals and recommendations contained in the report are broad. The recommendations are to the Nation and to the Federal Government; many of them correspond to the goals of NIH research/training programs. For example, one recommendation is that "Federal agencies that employ scientists and engineers should continue to recruit, train, and advance more from underrepresented groups."

The report highlights the MARC Program as a model intervention, which the Task Force recommends be replicated by other agencies and be expanded to include women and the disabled. The report also recommends hands-on laboratory programs for students at all education levels. This strategy is used by many of the NIH minority research/training programs.

In December of 1989, the Task Force released a final report, which reiterates the goals described in the interim report and calls for commitment from the government, educators, parents, industry and the media to fulfill them.

**1991 REPORT ON
INVESTING IN HUMAN
POTENTIAL: SCIENCE
AND ENGINEERING AT
THE CROSSROADS**

The American Association for the Advancement of Science recently published this report, which examines the efforts made by U.S. higher education institutions to increase the **number of women, minorities, and the disabled entering** science and engineering careers. The authors surveyed more than 276 presidents and chancellors and 400 program directors of recruitment programs. While most of the recommendations of the report were directed at colleges and universities, the report included the following recommendations for the Federal Government:

- Supporting the research capability of programs with a proven record of developing students from underrepresented groups, such as the MARC, MBRS, and RCMI programs.
- ◆ Providing scholarship support for students from underrepresented groups to encourage their participation and retention in science and engineering fields.
- ◆ Evaluating the effectiveness of portable and institutionally based sources of graduate support for minority students and funding the models most effective in supporting the development of these students.
- ◆ Including access to programs and institutions by underrepresented groups as a major criterion to determine merit in evaluating proposals for establishing major research centers or for renewing contracts or cooperative agreements for existing centers.
- ◆ Encouraging and supporting enhanced data collection by colleges and universities to provide indicators of participation in science and engineering by race/ethnicity, sex, and disability status.
- ◆ Providing Federal support for a range of program structures to address underrepresentation in science and engineering at undergraduate and graduate levels.

1993 PROPOSED REPORT In 1993, the IOM is planning to release *Career Paths for Clinical Research*. This report will examine the barriers to pursuing a career in research on human subjects. The report will focus on physicians, nurses, dentists, pharmacists, psychologists—any profession in which a member may conduct clinical research. A section of the report will address the specific obstacles faced by women and minorities.

**ON CAREER PATHS FOR
CLINICAL RESEARCH**

NIH EVALUATION ACTIVITIES

**1989 REPORT OF THE
TASK FORCE FOR THE
REVIEW OF THE NIH
BIOMEDICAL RESEARCH
TRAINING PROGRAMS**

Three NIH task forces, the Task Force on Physician Scientist Training, Task Force on Training Opportunities in Clinical and **Community-Based Study Designs and Methodology**, and Task Force on Predoctoral and Postdoctoral Training of Non-physician Scientists, were established to review NIH biomedical research training programs in terms of traditional

programs to develop physician scientists, areas of research training not adequately addressed, and traditional programs for nonphysician scientists. The task forces jointly made a number of recommendations for improvements in the current programs.

One recommendation specifically refers to underrepresented minorities. The report states that databases should be maintained for each training program and that “of particular interest are the number of, and information regarding, underrepresented minorities and women appointed to research training grants and supported by other research training and career development mechanisms and by the MBRS Program.”

**1992 NHLBI
ASSESSMENT OF
THE STATUS OF
THE MINORITY
SCHOOL FACULTY
DEVELOPMENT AWARD
PROGRAM**

The Minority School Faculty Development Award Program (MSFDAP), administered by NHLBI, gives faculty members at eligible institutions an opportunity to manage a research project in collaboration with an established investigator (mentor) having expertise in the faculty member’s area of research interest. The MSFDAP began in 1985, and the assessment reviewed the current program and examined the outcomes of the 10 awardees who had completed the 5-year award. Due to the small number of individuals who had completed the program, this was not an evaluation in the strictest sense of the word. The reviewers interviewed the awardees (9 of 10), the mentors (all), and the awardees’ department chairs (8 of 9). The authors were unable to contact those individuals who applied to the program but were not funded.

The report cites several strengths of the NHLBI program. Participation appeared to make awardees more knowledgeable, increase their publication record, and pave the way for their obtaining grants from the NIH and other sources. Their active labs directly exposed high school, college, and postdoctoral students to biomedical research. The program created an opportunity for minority institutions to gain grant administration experience. In addition, there was evidence that the program strengthened science departments at minority institutions and improved the relationship with the mentor institution. Finally, the program seemed to promote the overall visibility of minority scientists.

The report also cites a few program weaknesses. The structure of MSFDAP appeared to exacerbate tensions

between the needs of the awardee and those of the institution. This situation was reflected in conflicts over release time from teaching to do research. Other weaknesses cited in the report were a lack of clarity in the goal of the program and a lack of funds for laboratory assistants, equipment, and supplies.

The final chapter includes a list of recommendations to improve the program. None of these indicated that a major reworking of the program was required. In spite of the very small sample size, this was a thorough assessment of the MSFDAP. The strengths of the program seem clear and consistent and the weaknesses easily remedied.

**1992 REPORT AND
RECOMMENDATIONS OF
THE Ad Hoc MBRS
ADVISORY GROUP**

In 1991, an informal group of advisors was convened by the NIGMS to discuss the goals of the MBRS Program. The 18-member ad hoc advisory group was charged with assisting NIGMS in establishing goals and recommendations for future program planning.

The group met twice, examined program information, held discussions, and exchanged written correspondence. The activities of the group were not evaluative in nature, focusing instead on producing a report that outlined three broad goals and numerous recommendations. According to the report, the mission of the MBRS Program is:

to engage and enhance the research capability of faculty-scientists at eligible institutions in biomedically related research, and to provide opportunities for minority students, underrepresented in science, to participate in faculty research projects and enrichment programs The mission clearly embodies increasing the number of minority group faculty engaged in research and students pursuing and achieving advanced, doctorate level preparation for research careers.

The report stated that the first priority of the MBRS Program is the funding of quality faculty research projects at eligible institutions. The second is creating opportunities for students underrepresented in the sciences to participate in biomedical research as a way to motivate them toward research careers. The advisory group called for accurate and complete data on the number of students from each institution who have entered advanced research training, earned the Ph.D., or completed a professional degree and are engaged in research careers. An assessment of the accomplishments of faculty

members who have received MBRS support for their research projects was also recommended.

The report includes specific recommendations to enable the MBRS Program to achieve its mission. The convening of the ad hoc advisory group and the issuance of the eight-page description of recommendations is evidence that ICD's that have ongoing minority research/training programs like NIGMS, NCCR, and NHLBI have recognized the value of self-examination and assessment.

**MBRS AND MARC
HURT DATA MATCHES
TO NRC-DRF, AAMC
AND ADA FILES**

In September 1987, the staff of the DRR matched data from the MBRS record file to the NRC's DRF and the data files of the AAMC and the American Dental Association. They found that of the 13,151 students supported by MBRS funds from 1972 to 1987, 254 earned Ph.D.'s, 773 earned M.D.'s and 51 had D.D.S. degrees. No corrections for matching errors were made.

The matching between the MBRS record file and the DRF has been recently updated through 1989 by the NIGMS. The match found that of 15,503 students, 304 had earned Ph.D. degrees. Information on the period of MBRS support for these individual Ph.D. degree recipients is not available.

A similar DRF match was performed by the NIGMS on a sample of MARC Honors Program trainees. The 2,752 MARC Honors undergraduates supported from 1977 to 1990 were checked with the DRF. This match found that of 2,752 MARC Honors Program recipients, 54 had earned Ph.D.'s. The average time from receipt of the B.S. degree to receipt of the Ph.D. degree for these students was 6 years. The 54 Ph.D. recipients are all from among a cohort of 1,264 MARC Honors undergraduate trainees supported during FY 1977 through 1984. The data suggest that approximately 7 percent of MARC-supported undergraduate students earn the Ph.D. degree within 10 years after receipt of the bachelor's degree.

**NIGMS EVALUATION
OF THE MINORITY
ACCESS TO RESEARCH
CAREERS (MARC)
HONORS UNDER-
GRADUATE RESEARCH
TRAINING PROGRAM**

The NIGMS has recently been granted \$592,952 to evaluate the MARC Honors Undergraduate Research Training Program and has already developed a detailed study design. The funds will be used to pilot test the survey instruments; conduct surveys of current and former trainees, MARC faculty, and MARC program directors; ensure adequate response rates; process and analyze the data; and report the results.

The NIGMS divided the MARC evaluation into two phases, a retrospective study phase and a prospective study phase. Only the retrospective study is included in the funded proposal. The first phase will perform retrospective comparisons with current databases, develop a descriptive database on the MARC Honors Program and participants, and perform multivariate analyses of program outcomes.

The objectives of the evaluation are to compare outcomes of the MARC Honors Program with those of minority graduates of other institutions, assess the educational and career outcomes of former MARC trainees, assess the effects of the MARC Honors Program on the grantee institutions, collect detailed information on the implementation of the program at each institution, and collect detailed information on the characteristics of MARC Honors trainees and trainee selection.

Data will be sought from all current and former MARC Honors Program trainees. Students will be located from information in existing NIH databases and from MARC program directors, school records, and other sources. Program data will be collected from all currently funded MARC Honors programs. Efforts will be made to collect the same data from former MARC Honors programs. While current databases will be used, it is acknowledged that they are incomplete and flawed in many respects. To determine accurately the educational and career outcomes of MARC Honors trainees and characterize the MARC Honors Program at each institution, a primary data collection effort is essential.

Unlike the 1985 MARC evaluation, this study proposes to include a number of comparison groups. The MARC Honors trainees will be compared with minority students who attended the same institutions and with all other minority students. Comparisons will also be made among trainees from the various MARC programs. The MARC institutions will be compared with schools that were approved for funding but were unfunded, with MARC and non-MARC institutions being matched on the basis of a number of characteristics. In addition, MARC Honors programs at different institutions will be compared, and schools funded at different times will be compared.

As the proposal states, "The information from this evaluation will have NIH-wide applicability to the design and operation of recruitment and training programs, particularly those aimed

at increasing the participation of minority students in biomedical research careers. The results will be used by the NIGMS in making decisions affecting program operation, coordination of the MARC Program with other Institute research training programs, and coordination with the Minority Biomedical Research Support (MBRS) Program.”

ESTABLISHMENT OF AN ANALYTIC DATABASE TO ASSESS STAFFING PATTERNS ON NIH GRANTS

The Office of the Director, NIH, has recently approved the use of \$250,000 to initiate a project to establish an electronic database to document staffing patterns on NIH research grants. Specifically, the project aims to (1) increase the sample size of grants included for study from 5 percent to 30-50 percent, (2) increase the sample of grants included for study from only R01's and P01's to all mechanisms in the NIH portfolio, and (3) include personal identifiers (name, Social Security number, gender, and race/ethnicity) of the principal investigator and key scientific personnel.

This project will provide critical baseline data for ICD or NIH-wide analyses of research/training programs. Once in place, the database will be used to help track individuals through time from their appointments as trainees or fellows to their service as principal investigators.

ASSESSMENT OF DATA QUALITY AND ACCURACY OF THE TRAINEE APPLICANT FILE AND THE TRAINEE AND FELLOW FILE

The NIH Office of Science Policy and Legislation is currently conducting an evaluation of the data quality and accuracy of the NIH Trainee Applicant File (TAF) and the Trainee and Fellow File (TFF). The TFF is a consolidated database maintained by NIH for purposes of analyzing research training programs of the NIH as well as other agencies of the U.S. Public Health Service. It includes data converted from the TAF and other databases that comprise the IMPAC system. To improve the quality of the TFF, a systems analysis is being performed to examine current data coding, entry, handling, and transfer processes and to identify the nature and extent of potential systematic sources of error. The final report, including recommendations for improving the system, **is expected to be completed in the near future.**

In conclusion, all of the assessments conducted to date have been successful in identifying some of the strengths and weaknesses of NIH research/training programs. However, this review of previous evaluations highlights the need for more thorough assessments of minority research/ training programs that include quantitative analyses of the

effectiveness of different programs in meeting their stated goals and objectives.



SECTION 6:

PROPOSED THREE-PHASE EVALUATION OF NIH MINORITY RESEARCH/TRAINING PROGRAMS

The NIH Minority Programs Evaluation Committee proposes that a broad and relatively straightforward evaluation be designed, which would include developing a system for tracking all underrepresented minority individuals who receive NIH research/training support, for the purpose of assessing the success of the NIH minority research/training programs in achieving programmatic objectives and long-term goals. The tracking system should be prospective in nature and specifically designed to provide ongoing, timely feedback to NIH administrators responsible for the various NIH minority research/ training programs.

Because of the significant challenges inherent in such an evaluation, including the specific problems outlined in this report, it is strongly recommended that the trans-NIH evaluation be conducted in close coordination with major evaluations being planned by other NIH components. Of particular relevance are the NIGMS evaluation of the MARC Honors Program, the proposed evaluation by the Office of Science Policy and Legislation to establish an analytic database to assess staffing patterns on NIH grants, and the NIH-wide reporting system that is currently being developed by the NIH Training Advisory Committee and coordinated by the NIH Office of Extramural Research to gather and maintain information on former NRSA trainees. Considerable work has already been done with respect to each of these studies, and the Evaluation Committee hopes to build on these ongoing efforts.

The Committee's proposal for a three-phase evaluation is outlined below:

PHASE 1: REPORT FOR DR. BERNADINE HEALY, NIH DIRECTOR

The present report to Dr. Healy includes the following sections:

- ◆ Background information.
- ◆ Overview of NIH extramural research/training support, including trend data for minority applicants and recipients of traditional nontargeted NIH research grants and postdoctoral fellowships.
- ◆ A summary description of the different NIH minority research/training programs, including data on the number of individuals who have been supported by each of the programs and the overall levels of support provided, showing trends through time as well as available outcome data.
- ◆ Limitations of current NIH data collection procedures.
- ◆ Results from and plans for other studies of NIH minority research/training programs.
- ◆ Proposed three-phase evaluation of NIH minority research/training programs.

PHASE 2: PLANNING PHASE

Implementation of a feasibility study to design a broad and relatively straightforward prospective evaluation of NIH minority research/training programs, which will include the following steps:

- ◆ **Development of formal programmatic objectives and long-term goals** for each of the NIH minority research/training programs, including criteria for successful academic and career outcomes and research accomplishments.
- ◆ A comprehensive needs assessment, including formative evaluation strategies and targeted data collection (e.g., focus groups, indepth interviews, surveys of students, researchers, program administrators, NIH administrators)

to obtain information on how candidates for different minority research/ training programs are being recruited and retained, why some underrepresented minority individuals who receive NIH research/training support do not pursue careers in biomedical and behavioral research, why a relatively large number of long-term MBRS and RCMI investigators are not applying for and successfully competing for nontargeted NIH research grants, and how the various programs could be improved to better attain their programmatic objectives and long-term goals.

- ◆ Design of a trans-NIH computerized system to track effectively the academic and career paths of individuals who receive NIH research/training support.
- ◆ Development of a detailed study design and implementation plan for a broad-based evaluation of NIH minority research/ training programs, including retrospective analyses of long-standing programs (such as MBRS and RCMI), as well as a routine reporting system for providing systematic feedback to program administrators and periodic summative evaluation studies. The plan should be specifically designed to minimize costs and administrative burden required for implementation.

PHASE 3: IMPLEMENTATION PHASE

Implementation of the broad-based evaluation of NIH minority research/training programs, which will include the following steps:

- ◆ Revision of several PHS grant application and appointment forms and design of new reporting forms and other mechanisms to collect information from trainees, investigators, and program directors that is determined to be essential for monitoring the effectiveness of different NIH minority research/training programs, obtaining OMB approval where necessary.
- ◆ Amendment of one or more NIH systems of records currently authorized under the Privacy Act, if necessary, to **permit the collection of racial/ethnic data and personal identifying information** for all individuals who receive research/training support from the NIH, including trainees,

faculty members, collaborating investigators, and project support staff.

- ◆ Implementation of the modified PHS forms and additional forms, including appropriate training.
- ◆ Implementation of the computerized tracking system and other analytic techniques (e.g., linking with non-NIH databases) to track the academic and career paths of underrepresented minority individuals who have received NIH research/training support, with suitable comparison groups included whenever possible.
- ◆ Implementation of a routine reporting system to provide NIH administrators, ICD directors, and the Director of NIH with periodic and systematic feedback on how well their respective programs are conducting program-related activities and achieving their programmatic objectives and long-term goals.
- ◆ Implementation of retrospective analyses and periodic evaluation studies, using valid comparison groups wherever possible, to assess the extent to which the different NIH minority research/training programs have been successful in increasing the number of biomedical researchers who are members of underrepresented minority groups and to identify characteristics that correlate with success.
- ◆ Identification of model programs and specific recommendations for improving each of the NIH minority research/training programs.
- ◆ Implementation of a plan to evaluate periodically the usefulness and future needs for ongoing programs.

CONCLUSION

This Phase 1 report is a major step in actualizing the Minority Health Initiative envisioned by NIH Director Dr. Bernadine Healy. The NIH Office of Research on Minority Health and the NIH Minority Programs Evaluation Committee are hopeful that the proposed three-phase evaluation plan will be implemented as expeditiously as possible to obtain the information needed to assess effectively each of the NIH minority research/training programs and the involvement of underrepresented minority students and scientists in traditional nontargeted NIH research and research training programs. This type of broad-based evaluation effort is critically needed at this time to ensure accountability, to maximize the effectiveness of limited resources, and to enable administrators to better understand the complexity of the problems being addressed by their programs. It will provide the information needed to develop strategies for improving the programs, reduce the gap between expected and actual outcomes, and ultimately increase the number of research scientists who are members of racial/ethnic groups that are currently underrepresented in the biological and behavioral sciences. Without such an ongoing data management system and broad evaluation, the NIH will have no choice but to continue to operate as it has in the past, gathering post hoc data through periodic surveys and relying upon existing databases, such as the DRF, and anecdotal data that provide only partial information on programmatic outcome.

A central goal of each of the targeted NIH minority research/training programs described in this report has been to increase the number of underrepresented minority students and researchers participating in the numerous nontargeted research and research training programs that constitute a large proportion of NIH extramural research support. However, the trend data presented in this Phase 1 report show that the number and percentage of minorities participating in these regular programs remain extremely small. A coordinated effort among all ICD's and existing minority research/training programs, and perhaps additional targeted programs, will be needed to achieve the goal of greater numbers of underrepresented minority biomedical and behavioral researchers.

Through the implementation of a comprehensive assessment and evaluation of NIH minority research/training programs, the NIH will be in a far better position to demonstrate accountability of appropriated funds, accomplish its long-term mission of providing effective training and research support to a wide range of promising individuals, and thereby significantly enhance the future of biomedical and behavioral research.

REFERENCES

1. The Task Force on Women, Minorities, and the Handicapped in Science and Technology. *Changing America: The New Face of Science and Engineering*. Final report, December 1989.
2. Committee on Biomedical and Behavioral Research Personnel, Office of Scientific and Engineering Personnel, NRC. *Biomedical and Behavioral Research Scientists: Their Training and Supply*. Washington, D.C.: National Academy Press, 1989.
3. Thurgood, D.H., and J.M. Weinman. *Summary Report 2990: Doctorate Recipients from United States Universities*. Washington, D.C.: National Academy Press, 1991.
4. Institute of Medicine. *Minority Access to Research Careers: An Evaluation of the Honors Undergraduate Research Training Program*. Washington, D.C.: National Academy Press, 1985.
5. Coggeshall, Porter E., and Prudence W. Brown. *The Career Achievements of NIH Predoctoral Trainees and Fellows*. Washington, D.C.: National Academy Press, 1984.
6. Garrison, Howard H., and Prudence W. Brown. *The Career Achievements of NIH Postdoctoral Trainees and Fellows*. Washington, D.C.: National Academy Press, 1985.
7. The Task Force on Women, Minorities, and the Handicapped in Science and Technology. *Changing America: The New Face of Science and Engineering*. Interim report, September 1988.
8. Malcom, Shirley M., and Marsha Lakes Matyas, eds. *Investing in Human Potential: Science and Engineering at the Crossroads*. Washington, D.C.: American Association for the Advancement of Science, 1991.

APPENDIX
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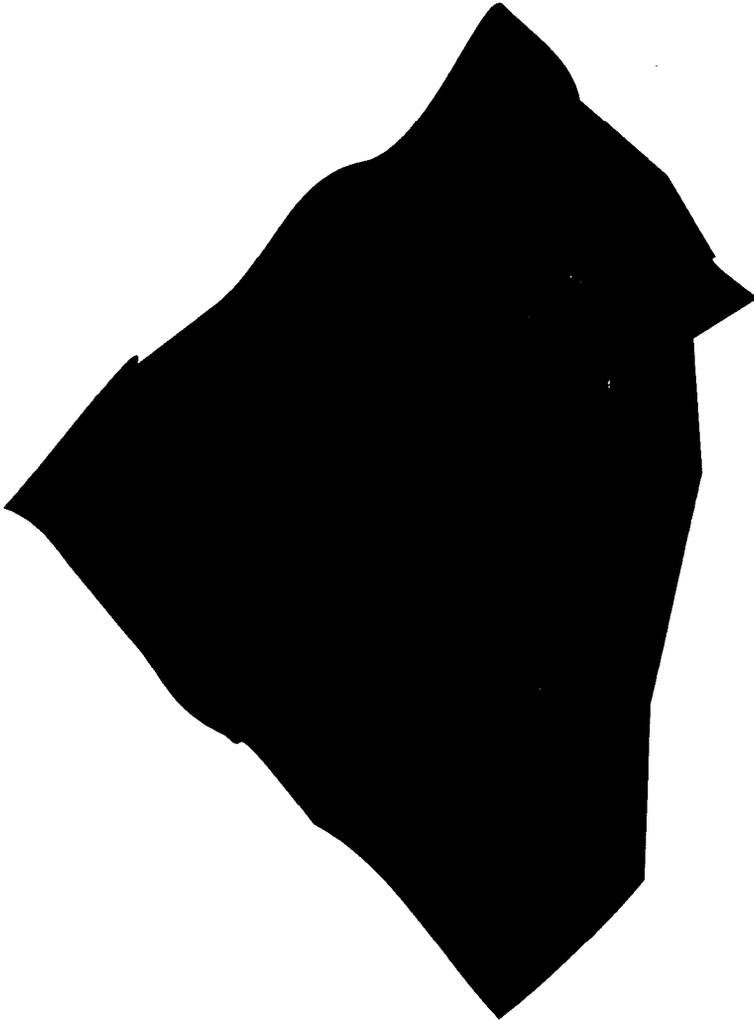
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