Customer Satisfaction and Research Involvement Among Applicants for NIH R01 and R29 Grants

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EXECUTIVE SUMMARY

In October 1997, a stratified random sample of 2,694 individuals who had applied to the National Institutes of Health (NIH) for an R01 or R29 research grant in FY 1994 were surveyed to assess their satisfaction with the NIH's grant application and review process. The survey also aimed at obtaining applicants' suggestions for ways in which the NIH could improve this process, along with gaining a better understanding of biomedical scientists' overall involvement in research. Approximately 85 percent of eligible and contacted individuals returned the questionnaire.

Characteristics of Respondents

Over three quarters (78 percent) of respondents held Ph.D.s or other research doctorates, the majority (83 percent) of which were in the biomedical sciences. Females accounted for one of every four respondents, and 4 percent were underrepresented minorities. Nearly all respondents (93 percent) were working full-time in academic institutions, with slightly more than half of this group employed at one of the top 50 institutions in terms of FY 1996 NIH research awards. Only a minority of respondents (2 percent) indicated that they no longer spent any time in research; for nearly two thirds (64 percent), at least half of their time was spent in this activity. The percentage of first-time applicants was 17 percent. Similar to the results of previous analyses by the Office of Extramural Research, slightly more than half of the respondents (54 percent) had received some type of NIH research funding by June 1997.

Satisfaction with the NIH Grant Application and Review Process

Based on their experiences in applying for NIH grants since FY 1994, respondents were asked to indicate how satisfied they were with how the NIH handled their application. About 41 percent indicated satisfaction, 35 percent expressed mixed feelings, and 24 percent were dissatisfied.

Of particular interest was the **lack** of differences in satisfaction among major groups that have often been viewed as holding distinct views about how well the review process has functioned. Overall satisfaction levels did **not** significantly differ between:

- First-time versus previous applicants.
- M.D.s versus Ph.D.s;
- Biomedical versus behavioral sciences Ph.D.s;
- Those requesting funds for clinical versus non-clinical research projects (as identified by the proposed use of human subjects in their research); and
- Those whose application was reviewed by a former ADAMHA versus another NIH institute.

Similar to the attitudes of respondents as a whole, approximately two-fifths of respondents in each of these subgroups were satisfied, and 25 percent were dissatisfied.

As might be expected, what **did** contribute to differences in satisfaction levels was applicants' funding status. For those who had received an NIH research grant by June 1997, the percentage of satisfied individuals was 57 percent -- more than double that of individuals who had been unsuccessful in

securing NIH research funds (23 percent). This disparity in opinions held for both first-time and previous applicants.

In addition to evaluating NIH review practices as a whole, applicants were queried about individual components of the review process. For the most part, no single element elicited dramatically higher or lower levels of satisfaction, and the percentages who were satisfied typically corresponded to those reported for overall satisfaction. However, there were a few distinctions. For example, the appropriateness of the scientific review group yielded the highest percentage of satisfied responses (47 percent) and one of the lowest percentages of dissatisfied reactions (22 percent). Timely receipt of the "pink sheet" and notification of the NIH's funding decision elicited the strongest reactions from applicants as evidenced by the lower proportions of mixed responses; 43-44 percent were satisfied, 36-37 percent expressed dissatisfaction, and 21-24 percent were mixed.

Among the major subgroups previously described, there were few differences in the satisfaction levels for each of these components, with one exception. Not surprisingly, unfunded applicants' greater dissatisfaction with the overall application and review process also characterized their evaluations of its individual components. Frequently, the percentages who were disgruntled with a specific feature were 2-3 times larger than those for funded applicants. At the same time, both groups expressed similar (and reasonably strong) opinions regarding the timeliness of feedback from the NIH with regard to the reviewers' comments and the funding outcome.

A Closer Look at Funded and Unfunded Applicants

As previously mentioned, consistently larger proportions of applicants who were not funded by the NIH were more dissatisfied overall than their funded counterparts. Because subgroups of individuals within each of these two categories may judge their experiences differently, separate analyses of funded and unfunded respondents were performed for males versus females, M.D.s versus Ph.D.s, biomedical versus behavioral sciences investigators, those working in research-intensive academic institutions versus other colleges and universities, junior versus senior faculty, and those whose salaries were more versus less dependent on external research support. These comparisons showed little differences, e.g., unfunded Ph.D.s expressed similar levels of satisfaction and dissatisfaction as unfunded M.D.s. The one exception was with regard to unfunded Ph.D.s in the biomedical sciences versus the behavioral sciences and other disciplines. Here, unsuccessful applicants in the biomedical sciences were **less** likely to be satisfied than those in the behavioral and other fields (32 versus 20 percent, respectively) and **more** likely to hold mixed opinions (40 versus 31 percent).

Subsequent Steps Taken for Unfunded Applications

In response to learning that their FY 1994 application was not awarded funds, about three fifths (57 percent) of respondents contacted a program or review official at the NIH to discuss the reasons for not receiving an award. More likely to have contacted the NIH were those who eventually received an NIH research grant by June 1997 (about three-fourths versus half of the applicants who remained unsuccessful). Previous applicants also were more likely to have approached NIH program or review staff than first-time applicants (about 60 percent versus 45 percent). About equal proportions (just under 60 percent) of men and women,, M.D.s and Ph.D.s, and those submitting applications for clinical and non-clinical research projects contacted the NIH to learn more about why an award was not made. Among the unfunded applicants who did *not* contact an NIH staff member, the overwhelming majority (80 percent) did not believe such communication would be helpful, and 24 percent either were unaware that such contact was an option or did not know whom they should contact.

Involvement in Externally Supported Research

The overwhelming majority of applicants, whether funded or unfunded, were involved in research. In addition, only 21 percent were *not* involved in any externally funded research as a principal investigator (PI), and this figure decreased to 13 percent if other key research roles (e.g., collaborator and co-investigator) were also taken into account.

The typical pattern was to be working on multiple projects. More than half (55 percent) of FY 1994 applicants were PIs on NIH grants, and 47 percent were PIs on one or more projects funded by other sources (e.g., other federal agencies, private foundations, and industry).[1] Nearly one-third were involved in NIH-funded research projects (but were not the PI), and 21 percent were serving in similar roles on other externally supported research projects. Even among unfunded applicants, more than half indicated that they currently were a PI on a non-NIH research project, and 30 percent indicated that they occupied a key personnel position on a current NIH grant.

It was the case, however, that those who had not successfully received an NIH research grant by FY 1997 devoted less time to research. Whereas 60 percent of those with NIH research support spent three fifths or more of their time in research, this was true for only two fifths of unfunded applicants. This latter group also was twice as likely to report that the time spent on seeking outside funding -- i.e., writing research grant applications -- and the difficulty in conducting preliminary research (that would most likely strengthen a research proposal) seriously hindered their research efforts. Finally, unfunded applicants who had successfully obtained non-NIH research support as a PI, along with those who reported no involvement in externally funded research, held the most negative views about their recent experiences applying for NIH grants.

Career Satisfaction and Overall Satisfaction with the NIH

Recently, there has been concern that biomedical investigators, particularly those in the early stages of their career, are becoming disenchanted with a research career due to the competitive funding environment and academic marketplace. A handful of survey items were included to gain a preliminary sense of how widespread such feelings were among those applying for NIH funds. In general, most respondents appeared satisfied with their career status. Sixty-five percent agreed that they were "basically satisfied" with where they were and what they were doing, 18 percent were neutral, and another 17 percent disagreed. In terms of perceived career opportunities, slightly more than half of respondents believed that there were opportunities for advancement both within their current position and, more generally, for someone with similar training and skills. It should be noted, however, that approximately one in four respondents expressed some level of disenchantment or pessimism with regard to current career prospects, and nearly one in five were dissatisfied with their current position and work responsibilities. Because no data on earlier cohorts are available for examination of changes over time, it is difficult to know the extent to which these results signal rising frustration and uncertainty among biomedical researchers.

These career-related views were associated with their overall satisfaction with how well the NIH had handled their applications. Across all respondents, those who were more positive about their current and future career paths were significantly more likely to be satisfied than those who held neutral or

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[1]Because individuals can have multiple research grants and contracts and serve in different roles, depending on the project, these percentages exceed 100 percent.

negative feelings about their careers. However, upon closer examination, this was true only for applicants who had not received NIH funding by June 1977.

Improvements in the NIH Application and Review Process

Applicants were asked to recommend ways that the NIH could improve its application and review process, and about 54 percent offered suggestions and observations. Of this group, more than half (56 percent) identified changes in the application process. Typically, these involved modifications in forms and submission practices, especially the increased use of electronic submissions and availability of forms in various word processing formats. Other frequent suggestions included shortening the length of applications and reducing the amount of information required (e.g., the use of "just-in-time" and modular budget initiatives).

In terms of the review process, using more expert reviewers was mentioned by almost one-third of those with recommendations. Here, comments often focused on the need for certain types of expertise (e.g., statistical genetics, patient-oriented research, and specific research methodologies/techniques). Fifteen percent also commented on aspects surrounding the fairness of the review process. Rather than specific recommendations, however, these responses typically cited the "inbred" nature of study section and the intrusion of factors other than merit into funding decisions. A similar proportion (14 percent) identified the need to reduce the length of time between submitting the application and receiving the funding decision -- one of the components that prompted the strongest reactions in the closed-ended satisfaction questions.

Predictable differences appeared between funded and unfunded applicants with regard to recommended changes. Those who were funded by FY 1997 more frequently offered suggestions concerning the application process (40 percent versus 28 percent of unfunded respondents). Among first-time applicants, those who were funded were more likely to recommend that the time between the submission and the funding decision should be shortened. Recommendations about the need for expert reviewers came more often from applicants who received funds from another source and those who received no support, when compared with those who received NIH support.

Perceived obstacles to research. In addition to areas where improvements were needed, respondents also were queried as to the degree to which nine specific factors hindered their research progress. Overall:

- The most frequent obstacle identified was the time devoted to preparing research grant proposals and applications. Thirty-four percent of respondents indicated that it hindered their research "a great deal", and another 42 percent responded that it negatively affected their research to "some extent." Unfunded applicants were more likely to view this as a substantial obstacle than their funded counterparts (41 versus 29 percent).

- Thirty percent of respondents cited the unavailability of funds for collecting pilot data as adversely affecting their research "a great deal," and an equal percentage (31 percent) viewed it as having "some" impact. Once again, unfunded applicants believed this to be a more serious problem, i.e., 44 percent responded "a great deal" as compared to 20 percent of funded applicants.

- Approximately one-fifth of respondents indicated that shortages of "capable graduate students" and shortages of qualified research personnel (e.g., postdoctoral fellows) hindered

their research "a great deal," and 35-36 percent described it as having "some" negative influence. At the same time, anywhere from 18-26 percent saw these problems as minimal or nonexistent. Funded applicants were slightly more likely to see the lack of research personnel as negatively affecting their research "a great deal" or "some" than did unfunded respondents (61 and 53 percent, respectively).

For the most part, respondents did not believe inadequate research facilities, space, equipment, or computing resources hindered the progress of their research (approximately one quarter indicated "a great deal" or "some" negative impact for each of these). Also, the unavailability of data or unique biological materials, which has received reasonable attention in the past few years, received only a minority of these two types of responses (13 percent).

Conclusions and Implications

In general, reactions to the NIH review and application process by former applicants leaned more toward satisfaction than dissatisfaction. Contrary to popular perceptions that satisfaction differs substantially for certain types of NIH "customers" (e.g., biomedical versus behavioral scientists), the results showed quite similar sentiments for M.D.s versus Ph.D.s; biomedical versus behavioral science Ph.D.s; first-ever versus previous applicants; and those who applied to one of the three former ADAMHA Institutes versus another NIH Institute. In fact, the lack of differences in overall satisfaction with how the NIH handled their applications as well as for specific components of the process is one of the notable findings of this survey.

As would be expected, the major difference in satisfaction was between those who had not received an NIH research award by June 1997 as compared to their funded counterparts. The percentage of unfunded applicants who were dissatisfied (39 percent) was more than three times larger than that found for funded applicants (12 percent). In addition to expressing negative views regarding the application and review process as a whole, unsuccessful applicants were more dissatisfied with several specific elements of the process (e.g., the assignment of the application to a review group, the reviewers' expertise, and the usefulness of the reviewers' comments). The one area in which funded and unfunded applicants shared similar opinions concerned the time required to receive the summary statement and learn of the final funding decision.

The timeliness of the "pink sheet" and notification of the NIH's funding decision, in fact, elicited the strongest views across all components, and it also was an area identified for improvement by a notable proportion of respondents when asked specifically for ways in which the NIH could improve the application and review process. This issue does not seem to be specific to the NIH, emerging as a common theme among scientists who apply for external research support. For example, the results of a recent National Science Foundation customer satisfaction survey of their 1995 grant applicants also identified that decreasing the time required for learning the final funding decision was important.

Another area targeted by respondents for improvement, particularly those who had been successful in obtaining NIH research support, was the need to streamline the application process. Typically, these targeted the desire to submit applications electronically and to require less information in grant applications (e.g., budgetary information). In fact, some changes recently implemented or being developed by the NIH (e.g., modular budgeting, electronic submission, and "just-in-time" initiatives) are ones that are responsive to recommendations put forward by survey respondents.

Ways to further facilitate contact between unsuccessful applicants and NIH program and review officials also may be an area which might benefit from further investigation by NIH staff. Although unfunded applicants are encouraged to contact the NIH to learn more about why their proposal was not awarded funds, nearly two fifths of these individuals did not do so with regard to their FY 1994 application. The primary reason was that they believed that this contact would not be helpful (80 percent). At the same time, nearly one-quarter said that they did not know that there was such an option or they were unclear whom to contact. Because those who were funded by FY 1997 took advantage of this option more often than did unfunded applicants (as did previous applicants in contrast to first-time applicants), this suggests that additional ways of alerting applicants about this option, particularly young investigators, may be beneficial.

Applicants' perceptions about factors which impede their research progress provide some additional information with regard to where the NIH could consider ways to fine-tune its extramural programs or develop new initiatives. About three fifths of all applicants cited the unavailability of funds for collecting pilot data as adversely affecting their research "a great deal" or "some". This was particularly true for unfunded applicants (73 percent), although over half (52 percent) of funded applicants expressed the same sentiments. Thus, efforts to assist this preliminary stage of research should be welcomed by investigators seeking outside research support. It also was the case that more than half of the applicants indicated shortages of qualified graduate students and research personnel to hinder their research progress to some or a great degree. This suggests that the extent to which future policies regarding the use of graduate students and postdoctoral fellows on NIH-funded projects exacerbate this problem may affect the type of reception they receive from the research community.

Another objective of the survey was to obtain a more complete picture of applicants' involvement in research regardless of their funding status at the NIH. Here, it was found that very few individuals overall have abandoned the research enterprise and spend no time at all in research. Even among unfunded applicants, a substantial fraction reported being PIs on non-NIH research projects or serving in other key research roles on NIH or non-NIH research grants.

Overall, the overwhelming majority of respondents (89%) were participating in one or both of these ways in externally funded research efforts. The survey results do, however, reinforce the major role that the NIH occupies in scientists' careers. Across all respondents, over half (55 percent) were PIs on an NIH research grant, and another 6 percent, although not a PI, were in other key research positions on NIH-funded research projects.

INTRODUCTION AND RESEARCH METHODS

Under contract to the National Institutes of Health (NIH), Macro International conducted a survey of individuals who applied to the NIH for an R01 or R29 research grant that was reviewed during fiscal year (FY) 1994. This survey had two objectives: (1) to obtain information on applicants' satisfaction with the NIH grant application and award process; and (2) to acquire a more complete picture of applicants' current involvement in research regardless of whether they received research support from the NIH.

To be eligible for membership in the target population, a person must have submitted at least one new or competing renewal application to the NIH that was reviewed between October 1, 1993, and September 30, 1994. Because eventually receiving NIH funds may involve multiple applications and resubmissions, the FY 1994 cohort was chosen to allow a reasonable amount of time to have passed for obtaining NIH support.[2]

Additional criteria for membership in the target population were as follows:

- The application was for an R01 or R29 grant that was submitted to any NIH Institute.
- The application was either unsolicited or submitted in response to an RFA.
- The application was handled by either the Division of Research Grants (now the Center for Scientific Review) or by an individual Institute.
- Once submitted, the application was neither withdrawn nor deferred.

A stratification scheme was devised for the 18,748 applicants who met these requirements. The stratification variables were chosen for the purpose of being able to perform comparisons between groups who might be expected to differ in their levels of satisfaction (e.g., funded versus nonfunded applicants).[3] The strata were:[4] (a) recent funding status—applicants who were funded versus not funded by the NIH as of June 1997; (b) application history—first-time versus previous applicants; (c) highest degree—Ph.D. versus M.D.;[5] (d) priority score for FY 1994 application—top versus bottom half; and (e) previous NIH funding history—funded versus not funded by FY 1994.[6] The final sample totaled 2,694.

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[2]Previous analyses indicated that approximately three fifths of FY 1990 applicants had been awarded NIH funding as a principal investigator (PI) within the three years following their application (see National Institutes of Health, "Outcomes of Unfunded Research Grant Applicants," February 1995).

[3]The sample sizes for these comparisons were designed in order to minimize sampling error (plus or minus 5 percent) and have sufficient statistical power (0.80) for detecting meaningful differences in overall satisfaction.

[4]Specific definitions for each stratum are presented in Exhibit B-1 in Appendix B.

[5]Included in the Ph.D. group are those with other types of research doctorates (e.g., D.N.Sc. or D.Sc.) and those with an M.D./Ph.D. The M.D. group also includes individuals with other types of health profession doctorates, such as D.V.M. and D.D.S.

[6]This applied to previous applicants only.

Survey topics and questions were developed by an internal NIH staff advisory group. A copy of the survey instrument is presented in Appendix A.

On October 17, 1997, an advance letter was sent to all sampled applicants, informing them of the importance of the survey and asking for their cooperation. About one week later, the survey was mailed to all respondents; another survey was mailed to all nonrespondents about three weeks later. After approximately another three weeks, attempts were made to contact all remaining nonrespondents by telephone, and a final survey was subsequently sent via certified mail or Federal Express to those who still had not completed and returned the questionnaire.

Of the 2,694 sampled applicants, 292 could not be reached (by neither telephone nor mail), another 12 were retired or deceased, 39 declined to participate, and 335 did not complete and return the survey. This left a total of 2,016 usable questionnaires.[7]

Over three quarters (78 percent) of respondents held Ph.D.s or other research doctorates, the majority (83 percent) of which were in the biomedical sciences. Females accounted for one of every four respondents, and 4 percent were underrepresented minorities. Nearly all respondents (93 percent) were working full-time in academic institutions, with slightly more than half of this group employed at one of the top 50 institutions in terms of FY 1996 NIH research awards. Only a minority of respondents (2 percent) indicated that they no longer spent any time in research; for nearly two thirds (64 percent), at least half of their time was spent in this activity. The percentage of first-time applicants was 17 percent. Similar to the results of previous analyses by the Office of Extramural Research, slightly more than half of the respondents (54 percent) had received some type of NIH research funding by June 1997.

A comparison of respondents and nonrespondents, based on available data from the NIH management information system, revealed few differences. Higher response rates were found for applicants with a Ph.D. as compared to those with an M.D., but the difference was small (78 percent versus 70 percent, respectively). The major difference in response rates was between funded and unfunded applicants. Whereas the response rate for funded applicants was 88 percent, it was 69 percent for those without NIH support.[8] This disparity introduces the possibility that nonrespondents might be considerably less active in research — a situation which, if true, could bias the findings on research involvement. However, this is unlikely to pose a serious threat. Based on additional data which was collected for a sample of nonrespondents, the majority (58%) appeared to be involved at some level in research as evidenced by their role as authors on recent publications.[9]

Because a disproportionate, stratified random sampling strategy was used to help ensure sufficiently large subgroups for analysis, the sample was not self-weighting, and all analyses were

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[7]To determine the response rate, two measures are useful. The first is the *upper bound response rate*, also known as the cooperation rate, which is computed as I/(I+R), where I = the number of completed surveys and R = the number of refusals. This rate measures the level of cooperation attained among identified, reached, and eligible respondents. For this survey, the cooperation rate was 85 percent. The second measure is the *lower bound response rate*, which measures the amount of completed surveys per total sample. The lower bound response rate for this survey was 75 percent.

[8]Additional information about the sample is presented in Appendix B.

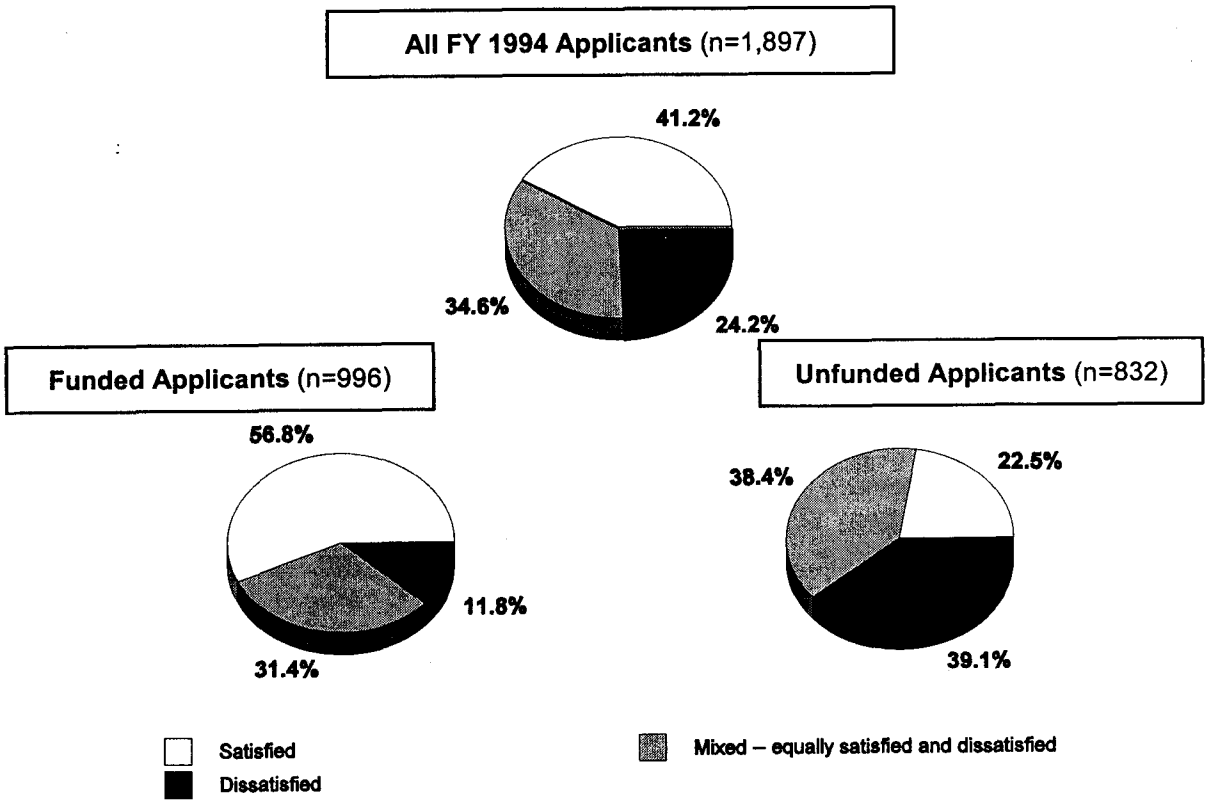
[9]For a random sample of 100 nonrespondents, searches of MEDLINE and other bibliometric data bases (e.g., PsycInfo and Sociofile) found that 58% of this group had published at least one article between 1998 and 1999.

conducted using SUDAAN. Weights were calculated to adjust for sampling and nonresponse and to make the estimated case counts equal to the number of respondents. All tables in the following sections report weighted *n*s.

SATISFACTION WITH THE NIH GRANT APPLICATION AND REVIEW PROCESS

Respondents were asked, "Overall, how satisfied or dissatisfied have you been with how the NIH handled your applications?" and were requested to consider all applications submitted since FY 1994 in their responses.[10] About 41 percent indicated satisfaction, 35 percent had mixed feelings, and 24 percent were dissatisfied (see Figure 1).

Figure 1. Overall Satisfaction with the NIH Grant Application and Review Process: Funded, Unfunded, and All Applicants



Note. "Funded Applicants" refer to those who were funded by the NIH as a Principal Investigator (PI) by June 1997; "Unfunded Applicants" included those who were not awarded NIH research funds as a PI by this date. The difference in satisfaction between funded and unfunded applicants was statistically significant ($\chi^2 = 218.42$, df = 2, $p < 0.001$).

[10]The survey offered five responses: completely satisfied, mostly satisfied, mixed—equally satisfied and dissatisfied, mostly dissatisfied, and completely dissatisfied. (A response of "don't remember" was also offered.) For the analysis, the five categories were collapsed into three: satisfied, mixed, and dissatisfied.

The **major** difference in overall satisfaction was that those who had received an NIH research grant by June 1997 were more satisfied than those who had not been awarded support. Whereas 57 percent of funded respondents were satisfied and a minority (12 percent) expressed dissatisfaction, the percentage of satisfied, unfunded applicants was only 23 percent, and a much larger fraction (39 percent) were dissatisfied. This same disparity in funded and unfunded applicants' opinions was true for both first-time and previous applicants.(Exhibit 1).[11] Among unfunded applicants, reactions were similar for those with and without other external research support.

Exhibit 1

Overall satisfaction with how the NIH handled their applications by funding status (in percents)

Characteristic	Satisfied	Mixed	Dissatisfied	# of Respondents
First-time applicants: Funding status by June 1997 (χ^2 = 236.91, df = 2, p < 0.001)				
Funded	65.8	28.0	6.1	130
Not funded	26.2	36.0	37.8	189
Previous applicants: Funding status by June 1997 (χ^2 = 153.46, df = 2, p = < 0.001)				
Funded	55.5	31.9	12.6	866
Not funded	21.5	39.1	39.5	643
Overall funding status as a PI by June 1997 (χ^2 = 197.21, df = 4, p = < 0.001)				
Funded by the NIH as a PI	56.8	31.4	11.8	996
Not funded by the NIH but funded as a PI by another source	20.1	39.1	40.7	439
Not funded by the NIH *and* not currently funded as a PI by any other source	25.8	37.2	37.0	351

Overall Satisfaction for Key Subgroups

Several subgroups of applicants were compared to determine whether their overall satisfaction levels varied. These comparisons were chosen to examine common perceptions regarding individuals' experiences with applying to the NIH:

- First-time applicants (who have had less experience with the NIH grant application and review process) may have views different from those who have submitted multiple applications.

[11]Throughout this report, statistically significant differences are reported in exhibits. (Occasionally, statistical comparisons were not feasible, such as when cell sizes were too small for valid analysis.) Where no statistical test is reported, the reader can infer that the difference is not significant unless stated otherwise.

- Because the structure and sequence of research training differs between programs in the health professions and research disciplines, experiences and views for M.D.s (and other health professional doctorates) may be different from those for individuals with Ph.D.s.

- Experiences with the review process (and thus evaluations of it) may not be the same for those who submitted clinical research applications and those who proposed basic research projects.[12]

- Applicants to the three former ADAMHA Institutes (NIAAA, NIDA, and NIMH) also might have distinct reactions, because their review process was handled somewhat differently than the process for applicants to the other NIH Institutes.

However, overall satisfaction was **not** different for these applicant subgroups (Exhibit 2). The percentages who were satisfied, held mixed opinions, and were dissatisfied were essentially similar for: first-time versus previous applicants, those whose application was submitted to a former ADAMHA Institute versus all other Institutes, applicants for clinical versus nonclinical research, and applicants with an M.D. versus a Ph.D. Among Ph.D.s, satisfaction also did *not* vary according to whether the degree was earned in the biomedical sciences versus the behavioral sciences or another discipline.[13] For most of these subgroups, just over 40 percent of the applicants were satisfied, and just under 25 percent were dissatisfied.

Exhibit 2

Overall satisfaction with how the NIH handled their applications by selected applicant characteristics (in percents)

Applicant Characteristic	Satisfied	Mixed	Dissatisfied	# of Respondents
Applicant history				
First-time applicant	42.3	32.7	24.9	319
Previous applicant	40.9	35.0	24.1	1509
Institute of FY 1994 application				
NIAAA/NIDA/NIMH	43.7	34.1	22.2	224
All other Institutes	40.8	34.6	24.5	1,605

[12]Respondents whose grant application indicated that human subjects would be involved with the proposed research were classified as applying for clinical research support; those whose proposed research did not involve human subjects were classified as applying for nonclinical research support.

[13]The biomedical sciences include bioengineering, biophysics, epidemiology, health and life sciences, microbiology, molecular biology, neurosciences, nursing, pharmacology, physical sciences, physiology, and similar areas. The remaining category was comprised mostly of Ph.D.s in the behavioral sciences (anthropology, psychology, and sociology), although a small number held doctorates granted in such fields as education, mathematics, public policy, and other social sciences.

Exhibit 2 (continued)

Overall satisfaction with how the NIH handled their applications by selected applicant characteristics (in percents)

Applicant Characteristic	Satisfied	Mixed	Dissatisfied	# of Respondents
Type of research proposed[a]				
Clinical	42.2	32.6	25.1	705
Nonclinical	40.5	35.8	23.7	1,124
Highest degree				
Ph.D. or M.D./Ph.D.	41.8	33.6	24.6	397
M.D. or other health profession doctorate	41.0	34.9	24.1	1,432
Major field of Ph.D.[b]				
Biomedical	41.2	34.4	24.5	1,123
Behavioral or other	47.3	29.7	23.0	228

[a]See footnote 12 for the definition of clinical versus nonclinical research.

[b]See footnote 13 for the definition of biomedical sciences, behavioral sciences, and other fields.

Overall Satisfaction Among Unfunded Applicants

Because satisfaction levels among unfunded applicants were considerably lower, their responses were further examined by several applicant characteristics. Essentially, overall satisfaction was similar among unfunded applicants regardless of their highest degree and whether they had previously received an NIH grant. For those employed in academic settings, there also were no statistically significant differences between those working at one of the top 50 NIH research institutions and those with positions at other colleges and universities. In general, about one in five of the unfunded applicants in these subgroups were satisfied and about two in five were dissatisfied (Exhibit 3).

Exhibit 3

Overall satisfaction of *unfunded* applicants with how the NIH handled their applications by selected applicant characteristics (in percents)

Applicant Characteristic	Satisfied	Mixed	Dissatisfied	# of Respondents
Highest degree				
Ph.D. or M.D./Ph.D.	21.4	38.5	40.0	646
M.D. or other health profession doctorate	26.2	38.0	35.8	186
Previously received NIH grant				
Yes	22.9	37.0	40.1	408
No	22.2	39.7	38.1	424
NIH research ranking of academic employer (for those employed in academic institutions)[a]				
Among the top 50	24.1	37.5	38.4	265
Not among the top 50	23.1	45.7	31.2	284

[a]These rankings are based on the total money awarded to institutions of higher education by the NIH in FY 1996 for research.

Satisfaction with Specific Aspects of the Review Process

Although respondents did not differ much in their overall level of satisfaction (except when their funding status was considered), these views may not generalize to specific aspects of the application and review process. This section takes a closer look at their satisfaction with eight components of that process:

- Appropriateness of the scientific peer review group;
- Expertise of reviewers;
- Reviewers' understanding of the research plan, design, and methodology;
- Usefulness of reviewers' comments;
- Time it took to receive the summary statement (the "pink sheet") from the NIH;
- Time it took to find out the funding decision made by the NIH;

- Helpfulness of the reviewers' comments in understanding the funding decision made by the NIH; and

- Fairness of the NIH's funding decision.

No single component elicited dramatically higher or lower levels of satisfaction among respondents (Exhibit 4). Approximately 40 percent or more were satisfied with the appropriateness of the peer review group, the reviewers' expertise and understanding of the proposed research, the time to get the summary statement from the NIH and learn its funding decision, and the fairness of this decision. Somewhat smaller percentages were satisfied with the reviewers' comments for both their usefulness and

Exhibit 4[a]

Satisfaction with specific aspects of the review process (in percents)

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
The appropriateness of the scientific peer review group	46.5	31.6	21.9	1,813
The expertise of the reviewers	39.9	39.7	20.3	1,798
The reviewers' understanding of the research plan, design, and methodology	39.8	35.3	24.8	1,815
The usefulness of the reviewers' comments	31.4	38.9	29.7	1,807
The time it took to receive the summary statement ("pink sheet") from the NIH	42.8	20.6	36.7	1,793
The time it took to find out the funding decision made by the NIH	43.8	23.7	32.4	1,755
The helpfulness of the reviewers' comments in understanding the decision made by the NIH	35.3	29.2	35.5	1,767
The fairness of the NIH's funding decision	43.1	29.1	27.9	1,780

[a]No tests were conducted to determine statistical significant differences among the reported categories.

their helpfulness in understanding the funding decision. Furthermore, with regard to the value of the reviewers' comments to making sense of this decision, over one-third were dissatisfied —one of the largest percentages reported for disgruntlement with any one component. Forty-three percent were satisfied and 37 percent were dissatisfied with the amount of time it took to receive the "pink sheet," and this item produced the lowest proportion of mixed responses, suggesting that respondents held fairly strong opinions about this issue.

Over one-third of all respondents identified additional factors that affected their satisfaction with the application and review process. Of these:

- Twenty-five percent commented about the use of criteria other than merit, such as biases against certain types of research, overemphasis on pilot data, politics, and conflict of interest.

- Seventeen percent identified specific issues related to the reviewers' expertise and understanding of the application's content (e.g., lack of expertise in state-of-the-art methodologies or problems with interdisciplinary applications).

- Fourteen percent noted problems with the continuity of the review process, mainly the use of different reviewers (with different concerns) for resubmitted applications.

- About 10 percent targeted other aspects of the NIH (e.g., the role and behavior of NIH staff).

- Each of the following was mentioned by between 3 and 5 percent of those who identified additional factors: the application process itself, reviewers' attitudes toward new ideas, and the processes for responding to reviews and appealing decisions.

Satisfaction with Specific Aspects of the Review Process by Funding Characteristics

Once again, satisfaction levels with the eight components differed in somewhat predictable ways, depending on whether they had received NIH funding by June 1997 (Exhibit 5):

- About twice as many funded applicants were satisfied with the appropriateness of the scientific peer group when compared with unfunded applicants (59 and 31 percent, respectively).

- Regarding both reviewers' expertise and their understanding of the proposal, almost half of the funded applicants but less than 30 percent of unfunded applicants were satisfied.

- The percentages of unfunded applicants who were dissatisfied with the usefulness of the reviewers' comments or their helpfulness in understanding the funding decision were nearly twice as large as those for funded applicants. For example, nearly half of the unfunded applicants were dissatisfied with the helpfulness of reviewers' comments for understanding the funding decision as compared to about one-fourth of those awarded NIH funds.

- Not surprisingly, whereas 61 percent of funded applicants were satisfied with the fairness of the NIH's funding decision, only 21 percent of unfunded applicants shared this opinion.

Both groups, however, expressed similar (and reasonably strong) reactions regarding the time required to receive the "pink sheet" and learn whether an award was to be made. Slightly more than two-fifths of both funded and unfunded applicants were satisfied and anywhere from 31 to 39 percent were dissatisfied with this part of the process.

Exhibit 5

Satisfaction with specific aspects of the review process by funding status (in percents)

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
The appropriateness of the scientific review group ($\chi^2 = 118.39$, df = 2, $p < 0.001$)				
Funded	59.4	27.6	12.9	994
Not funded	30.7	36.4	32.8	819
The expertise of the reviewers ($\chi^2 = 68.82$, df = 2, $p < 0.001$)				
Funded	49.0	37.8	13.2	989
Not funded	28.9	42.1	29.1	809
The reviewers' understanding of the research plan, design, and methodology ($\chi^2 = 82.48$, df = 2, $p < 0.001$)				
Funded	50.5	32.9	16.6	996
Not funded	26.8	38.3	34.8	819
The usefulness of the reviewers' comments ($\chi^2 = 64.65$, df = 2, $p < 0.001$)				
Funded	38.9	40.2	21.0	994
Not funded	22.2	37.4	40.4	813
The time it took to receive the summary statement ("pink sheet") from the NIH				
Funded	43.3	22.1	34.6	981
Not funded	42.1	18.7	39.2	811
The time it took to find out the funding decision made by the NIH				
Funded	43.6	25.2	31.2	980
Not funded	44.1	21.9	34.0	776
The helpfulness of the reviewers' comments in understanding the decision made by the NIH ($\chi^2 = 67.70$, df = 2, $p < 0.001$)				
Funded	43.8	30.4	25.7	976
Not funded	24.7	27.8	47.5	791
The fairness of the NIH's funding decision ($\chi^2 = 253.21$, df = 2, $p < 0.001$)				
Funded	61.1	25.2	13.7	989
Not funded	20.5	33.9	45.5	791

Satisfaction with Specific Aspects of the Review Process for Other Key Subgroups

The eight components of the review process also were compared for selected subgroups, revealing some small differences in levels of satisfaction (see Appendix C, Exhibits C-1 through C-5):

- First-time and previous applicants, for the most part, expressed similar levels of satisfaction for all eight components. Where they differed involved the greater satisfaction of first-time as compared to previous applicants regarding the reviewers' expertise and understanding of the proposed research (44-45 versus 39 percent) and the usefulness of reviewers' comments (40 versus 30 percent).

- Respondents with an M.D. and those with a Ph.D. also expressed similar views on several elements of the review process. However, whereas Ph.D.s were more satisfied than M.D.s with the assignment of applications to review groups (48 and 40 percent, respectively), M.D.s were more likely to hold mixed opinions (37 percent versus 30 percent of Ph.D.s.).

- Compared to those in the biomedical sciences, behavioral scientists were more likely to be satisfied with the reviewers' expertise (49 percent versus 38 percent); in contrast, biomedical Ph.D.s were more apt to be dissatisfied (22 percent versus 12 percent). Behavioral scientists also held stronger feelings about the length of time it took to find out the funding decision -- only 17 percent expressed mixed opinions as compared to 24 percent of biomedical investigators -- and they were more dissatisfied than their biomedical counterparts with this feature of the review process (43 percent versus 32 percent, respectively).

- Similar to the comparisons between biomedical and behavioral investigators, those respondents who had applied to the NIAAA, NIDA, or NIMH held different views than those who had applied to other Institutes about the timeliness of the funding decision.[14] Although similar proportions were satisfied with this aspect (42 percent versus 44 percent, respectively), significantly more dissatisfaction was expressed by applicants to the NIAAA, NIDA, and NIMH (42 percent versus 31 percent).

- Individuals whose applications were for clinical research support (i.e., the research required human subjects review) were more satisfied with the usefulness of reviewers' comments than those applying for nonclinical research support (37 percent versus 28 percent).

A CLOSER LOOK AT FUNDED VERSUS UNFUNDED APPLICANTS

As previously reported, the most consistent pattern that emerged concerned the greater dissatisfaction among unfunded applicants regarding how well the NIH handled their applications. In this

[14]This result is also related to field of Ph.D. field, given that a much larger percentage (42 percent) of behavioral scientists' FY 1994 application was assigned to the NIAAA, NIDA, or NIMH as contrasted to 7 percent of those submitted by biomedical scientists.

section, funded and unfunded applicants are examined separately to explore whether certain characteristics also affect their satisfaction levels.

Before describing these results, it is useful to describe differences in the percentages of respondents who were and were not awarded NIH research funding by June 1997, depending on these characteristics. As Exhibit 6 shows:

- Equal proportions of males and females (54 percent) received NIH funding by June 1997.
- Funding rates were the same for white and Asian respondents (54 percent) but lower for underrepresented minorities (43 percent).
- Slightly over half of Ph.D.s were funded, as were M.D.s.
- Although slightly more respondents with Ph.D.s in the biomedical sciences (56 percent) were funded than respondents with doctorates in the behavioral sciences and other disciplines (49 percent), the difference was not statistically significant.
- Applicants to the former ADAMHA Institutes were funded at the same rate as applicants to all other Institutes.
- Applicants employed by academic institutions were funded at a significantly higher rate than those working in other types of settings (56 versus 43 percent).
- Those who reported spending more time conducting research (60 percent or more of their time) were significantly more likely to have received NIH funding than those who spent less time in this effort (60 percent versus 37 percent).

Exhibit 6

Funding status for various subgroups (in percents)

Applicant Characteristic	Funded	Unfunded	# of Respondents
Gender			
Male	53.7	46.3	1,534
Female	53.8	46.2	467
Race/ethnicity			
White non-Hispanic	54.2	45.8	1,673
Asian non-Hispanic	54.3	45.7	220
Underrepresented minority	42.6	57.4	71

Exhibit 6 (continued) **Funding status for various subgroups (in percents)**			
Applicant Characteristic	Funded	Unfunded	# of Respondents
Highest degree			
Ph.D. or M.D./Ph.D.	54.1	45.9	1,585
M.D. or other health profession doctorate	52.1	47.9	441
Field of Ph.D.			
Biomedical	56.2	43.8	1,243
Behavioral or other	49.1	50.9	250
Institute of FY 1994 application			
NIAAA/NIDA/NIMH	52.9	47.1	252
All other Institutes	53.8	46.2	1,774
Setting of current full-time employment ($\chi^2 = 6.26$, df = 1, $p < 0.05$)			
Academic institutions	56.0	44.0	1641
Nonacademic employment settings	43.1	56.9	132
Amount of time currently spent conducting research ($\chi^2 = 59.27$, df = 1, $p < .001$)			
Less than 60 percent	37.1	62.9	996
60 percent or more	59.5	40.5	845

Satisfaction by Funding Status and Selected Applicant Characteristics

Overall satisfaction was compared for selected subgroups, taking into account their funding status. Comparisons were made by gender, highest degree, and field of Ph.D. Satisfaction levels were also contrasted by the relatedness of their work to their professional and/or graduate training (a partial indicator of their involvement in the scientific research enterprise, particularly among Ph.D.s). For those in academic settings, satisfaction levels were contrasted by the research intensiveness of the institution (as measured by the amount of NIH research support awarded to the organization) and faculty rank.

Gender, Race/Ethnicity, and Highest Degree

Among all applicants, the satisfaction levels for males and females were similar: About 42 percent of male applicants were satisfied and 24 percent were dissatisfied with the way that the NIH had handled their applications. For female applicants, the figures were 40 and 24 percent, respectively. This lack of difference between men and women remained when their funding status was taken into account (Exhibit 7).

Exhibit 7

Overall satisfaction with how the NIH handled their applications by funding status and gender (in percents)

Gender	Funded			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Male	57.3	30.1	12.6	757
Female	55.8	34.7	9.8	226
Gender	**Not funded**			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Male	23.0	38.6	38.4	634
Female	21.3	37.7	41.0	188

In terms of race/ethnicity, 42 percent of white/Asian respondents were satisfied, and 24 percent were dissatisfied. Among the underrepresented minority respondents, nearly equal proportions were satisfied and dissatisfied (28 percent and 27 percent, respectively).[15] A far larger proportion of this group (45 percent) reported "mixed" opinions than was true for the white/Asian group of respondents (34 percent).[16]

As reported in an earlier section, Ph.D.s and M.D.s expressed virtually identical levels of satisfaction . Forty-two percent of Ph.D.s and 41 percent of M.D.s were satisfied; 25 percent and 24 percent, respectively, were dissatisfied. When funding status was taken into consideration, there also were no differences between Ph.D.s and M.D.s among funded respondents and among unfunded respondents (Exhibit 8).

The tendency for behavioral science Ph.D.s to be slightly more satisfied with the application and review process than their biomedical counterparts depended on their funding status. Across all applicants, nearly half (47 percent) of behavioral investigators were satisfied as compared to 41 percent of biomedical scientists who were more likely to hold mixed opinions. Whereas the satisfaction levels of funded applicants were similar for each of the two fields, a larger percentage of behavioral scientists who had not received NIH research grants by June 1997 expressed positive views than did their biomedical counterparts (Exhibit 9).

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[15]Underrepresented minorities include African Americans, American Indians, and Hispanics.

[16]Satisfaction levels of whites/Asians and underrepresented minorities differed (a cross-tabulation of the two race categories by the three levels of satisfaction produced $\chi^2 = 53.44$, df = 2, $p < .001$). This may partly be a function of differential funding success; as previously reported, the funding rate for whites and Asians was 54 percent as compared to 43 percent for underrepresented minorities. However, because the *n*s for Whites/Asians were 1,709 but only 66 for underrepresented minorities, analyses by both funding and minority status could not be conducted.

Exhibit 8

Overall satisfaction with how the NIH handled application by funding status and highest degree (in percents)

Degree	Funded			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Ph.D. or M.D./Ph.D.	57.1	31.8	11.0	785
M.D. or other health profession doctorate	55.6	29.7	14.8	211
Degree	**Not funded**			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Ph.D. or M.D./Ph.D.	21.4	38.5	40.0	646
M.D. or other health profession doctorate	26.2	38.0	35.8	186

Exhibit 9

Overall satisfaction with how the NIH handled their applications by funding status and field of study for Ph.D.s (in percents)

Field	Funded			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Behavioral or other	62.4	28.7	(a)	114
Biomedical	57.2	30.2	12.5	637
Field	**Not funded** ($\chi^2 = 6.32$, df = 2, $p < 0.05$)			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Behavioral or other	32.2	30.6	37.2	114
Biomedical	20.1	39.8	40.1	486

[a]Unweighted sample size for cell = 8; tests for statistical differences were not conducted for the "funded" portion of Exhibit 8.

Employment Characteristics

Across all respondents, 96 percent were employed and 4 percent were unemployed at the time of the survey. Because applicants whose work is less related to their doctoral training may be more likely to

be in non-research roles, it is interesting to examine whether their satisfaction differs from those whose work is more closely aligned with their doctoral training.[17] For those working in areas closely related to their doctoral training, 42 percent were satisfied and 24 percent were dissatisfied. The corresponding percentages for applicants employed in positions that they described as "somewhat related" were similar (37 percent and 26 percent, respectively).

When analyzed by funding status, over half of funded applicants whose work was either closely or somewhat related were satisfied, and less than 15 percent were dissatisfied. Although fewer than one-fourth of their unfunded counterparts were satisfied, satisfaction levels did not differ, based on the closeness of their work to their graduate training (Exhibit 10).

Exhibit 10

Overall satisfaction with how the NIH handled their applications by funding status and the relationship between their doctoral training and current work (in percents)[a]

Degree of Relationship	Funded			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Closely related	58.0	30.2	11.8	800
Somewhat related	51.8	35.8	12.5	161
Degree of Relationship	**Not funded**			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Closely related	22.9	38.6	38.5	662
Somewhat related	20.8	37.7	41.5	141

[a]Only full-time employed individuals were included in the analysis.

Respondents Employed in Academic Settings

Nearly 93 percent of all full-time employed respondents were working in academic institutions, with the remaining employed in a variety of settings (e.g., industry, hospitals and clinics, government agencies, and foundations). Given that the overwhelming majority of respondents were currently working

[17]Respondents were asked, "Thinking about the relationship between your current work and your education, to what extent is the field in which you are working related to the field of your highest degree?" Eighty-one percent of full-time employed individuals said "closely related," 17 percent said "somewhat related," and only a small minority (2 percent) said "not related." The unweighted sample size for respondents who said "not related" is less than 10, so their satisfaction is not reported.

in academia, additional analyses of their satisfaction ratings were performed for a handful of relevant characteristics.[18]

About 58 percent were employed at the 50 institutions receiving the most NIH funds. It is possible that these faculty may hold somewhat different impressions of the NIH from those working in other colleges and universities, given differences between these two types of environments in terms of the emphasis placed upon research, the institutional resources available for research, and the expectations and experiences of their immediate colleagues for attracting outside support. Also, success (or lack thereof) in being awarded NIH research funds may result in quite different consequences and thus assessments of how the NIH handled their grant applications.

In general, views were similar for respondents at the top 50 NIH research institutions as compared to those working at other colleges and universities. Approximately 46% of applicants from research-intensive institutions and 40% of those working in other academic settings were satisfied with the way the NIH handled their applications. The percentages who were dissatisfied were identical (21 percent).

Just under 60 percent of funded applicants were satisfied as compared to about one-fourth of unfunded applicants. Within each of these groups, the research-intensiveness of the institution was not related to different views (Exhibit 11).

Exhibit 11

Overall satisfaction with how the NIH handled their applications by funding status and research ranking of academic employer (in percents)[a]

Type of Institution	Funded			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Among the top 50	59.0	29.9	11.1	449
Not among the top 50	58.7	29.8	11.5	246
Type of Institution	**Not funded**			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Among the top 50	24.7	37.0	38.2	258
Not among the top 50	23.5	46.2	30.3	276

[a]This refers to the 50 academic institutions that received the highest amounts of NIH research funding in FY 1996. Only Individuals who were employed full time in academic institutions were included in the analysis.

[18]Of those with academic employment, 43 percent expressed satisfaction and 22 percent expressed dissatisfaction. Of respondents employed elsewhere, 24 percent were satisfied and 38 percent were dissatisfied. Because the overwhelming majority of survey respondents are employed at academic institutions, further comparisons between these individuals and those employed elsewhere were not conducted.

Another characteristic that may affect satisfaction levels is the degree to which investigators' salaries rely on outside support. Furthermore, satisfaction, dependence on outside support, and success at obtaining NIH research funds may interact (e.g., those who are unsuccessful and whose salaries are paid by outside research grants may be more dissatisfied than those whose salaries are less tied to external funds).

The degree to which respondents were in "soft money" positions did not by itself appear to influence their overall satisfaction with the NIH. For example, among individuals whose entire salary was *not* guaranteed by their institution (13 percent of respondents), 44 percent were satisfied and 27 percent were dissatisfied. For applicants in positions where more than three-quarters of their salary was guaranteed by their employer (45 percent of respondents), the results were similar -- 40 percent were satisfied and 24 percent were dissatisfied.[19]

Satisfaction for those respondents who were in "soft money" positions (i.e., none of their salary was guaranteed by their institutions) was associated with their success in obtaining NIH support (Exhibit 12). For those with NIH funding, nearly two-thirds were satisfied, and this percentage was the higher than

Exhibit 12

Overall satisfaction with how the NIH handled their applications by funding status and the percent of salary which was guaranteed by academic employers (in percents)[a]

Percentage of Salary Guaranteed	Funded			
	Satisfied	Mixed	Dissatisfied	# of Respondents
0	65.0	22.3	12.6	107
1 - 50	52.1	37.3	10.7	251
51 - 75	59.1	27.1	13.8	185
76 - 100	57.9	31.6	10.4	302
Percentage of Salary Guaranteed	**Not funded**			
	Satisfied	Mixed	Dissatisfied	# of Respondents
0	16.5	38.0	45.5	83
1 - 50	24.1	39.3	36.6	101
51 - 75	24.2	38.8	37.0	105
76 - 100	25.8	39.6	34.6	372

[a]Only individuals who were employed full time in academic institutions were included in the analysis.

[19]When some portion but not more than 50% of their salary was guaranteed (23 percent of respondents), 44 percent were satisfied and 18 percent were dissatisfied. Among those whose institutions guaranteed 51-75 percent of their salary (19 percent of respondents), the percentages of satisfied and dissatisfied respondents were 47 and 22 percent, respectively.

those for individuals who were less dependent on external support (although the difference was not statistically significant). Exactly the opposite sentiment was expressed by unfunded applicants in soft money positions who were the most dissatisfied in this group. This pattern is somewhat predictable, given that these individuals, compared with their counterparts who had NIH research support, may be more vulnerable to negative financial consequences as a result of not receiving an NIH research grant.

Faculty at different stages in their careers also may hold different views of the NIH grant and application process, depending on their success in securing such funds. Receiving an NIH research grant often is a contributing factor to salary decisions and may be especially critical to those involving tenure and promotion for assistant and associate professors. Once again, however, no strong relationships were found. Forty-three percent of professors were satisfied and 21 percent were dissatisfied, and among associate professors, 44 percent were satisfied and 24 percent were dissatisfied. The corresponding percentages for assistant professors were 37 and 26, respectively. When segmented according to funding status, there again were no statistically significant differences among faculty ranks (Exhibit 13).

Exhibit 13

Overall satisfaction with how the NIH handled their applications by funding status and faculty rank (in percents)[a]

Faculty Rank	Funded			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Professor	54.3	34.3	11.5	432
Associate professor	60.8	26.0	13.3	308
Assistant professor	54.5	34.8	10.7	113
Faculty Rank	**Not funded**			
	Satisfied	Mixed	Dissatisfied	# of Respondents
Professor	26.3	36.9	36.8	276
Associate professor	23.6	40.3	36.1	256
Assistant professor	20.4	38.7	40.9	121

[a]Only individuals who were full time employed in faculty positions were included in the analysis.

SUBSEQUENT STEPS TAKEN FOR UNFUNDED APPLICATIONS

Applicants to the NIH have the opportunity (and are often encouraged) to contact NIH program and review staff to learn more about the status of their applications, clarify reviewers' comments, and ask other questions with regard to their submission. This is particularly so for applicants who were not

awarded funds. The extent to which respondents contacted the NIH was examined, along with their perceptions about the helpfulness of these contacts. Comparisons also were made between certain subgroups, some of whom may be less apt to contact the agency.

Of respondents whose FY 1994 application was not funded, nearly half contacted a program official at the NIH, and one-fifth contacted a review official to discuss the reasons for not having received an award.[20] Those whom the NIH eventually funded by June 1997 were more likely to have contacted the NIH than those who remained unsuccessful (about three-fourths versus half of the applicants). Previous applicants also were more likely to have interacted with NIH staff than first-time applicants (about 60 percent versus 45 percent). Just under 60 percent of M.D.s and Ph.D.s, those whose applications dealt with clinical versus nonclinical research, and males and females contacted the NIH to follow up on the reasons for why an award was not made (Exhibit 14).

Among the 43 percent (n = 471) who did *not* contact anyone at the NIH:

- The large majority (80 percent) did not do so because they believed that such contact would not be helpful;
- One-fourth did not think that such contact was an option or did not know whom to contact.[21]

Exhibit 14

Whether applicants whose FY 1994 application was not funded did or did not contact the NIH by selected applicant characteristics (in percents)

Applicant Characteristic	Contacted the NIH	Did Not Contact the NIH	# of Respondents
Funded by June 1997 (χ^2 = 35.07, df = 1, p < 0.001)			
Yes	74.2	25.8	348
No	49.7	50.3	763
Highest degree			
Ph.D. or M.D./Ph.D.	58.5	41.5	239
M.D. or other health profession doctorate	57.0	43.0	872
Application history (χ^2 = 25.22, df = 1, p < 0.001)			
First-time applicant	45.6	54.4	215
Previous applicant	60.2	38.8	897

[20]Multiple responses were allowed, so respondents may have contacted both program and review officials.

[21]Again, multiple responses were allowed.

Exhibit 14 (continued)

Whether applicants whose FY 1994 application was not funded did or did not contact the NIH by selected applicant characteristics (in percents)

Applicant Characteristic	Contacted the NIH	Did Not Contact the NIH	# of Respondents
Type of application			
Clinical research	57.5	42.3	432
Nonclinical research	57.2	42.8	679
Gender			
Male	57.5	42.5	840
Female	58.7	41.3	258

For those who did contact the NIH, respondents were asked, "How much did the comments of the NIH official(s) help you understand why an award was not made?" In general, opinions were mixed. About 15 percent said "a great deal," 36 percent indicated "some," 26 percent said "only a little," and 23 percent believed "not at all."

Another step that can be taken following an unfavorable funding decision by the NIH is to submit the proposal to another funding source. Of those respondents whose FY 1994 application was not funded, less than half sought support from other sponsors. When they did, the National Science Foundation, the American Cancer Society, the American Heart Association, and private industry were the most frequently contacted organizations.

In making the decision to seek funding elsewhere for the proposed research, reviewers' written comments were viewed as the most instrumental, with nearly two-thirds rating them as influencing this decision "a great deal" (Exhibit 15). Comments or advice from colleagues and from NIH staff ranked a

Exhibit 15

Extent of influence regarding next steps for applicants whose FY 1994 proposal was not funded[a]

Factor	A Great Deal	Some	Only a Little	Not at All	# of Respondents
Written comments of reviewers	64.3	22.9	8.6	4.2	1,084
Comments or advice from colleagues	26.1	38.1	16.3	19.4	871
Comments or advice from NIH officials	15.0	25.5	15.2	44.3	945

[a]Statistical tests for Exhibit 15 are presented in Appendix C, Exhibit C-6.

Exhibit 16

Current involvement on research projects by funding status (in percents)
(n = 1,897)

Type of Current Involvement	Received NIH Funding by June 1997 (n = 1,023)	Did Not Receive NIH Funding by June 1997 (n = 874)	Total, All Applicants (n = 1,897)
PI on a project funded by any sponsors (listed below) other than the NIH			
Funded by a federal agency	14.5	20.9	17.5
Funded by a private nonprofit	23.0	21.1	22.1
Funded by a private for-profit	10.1	16.1	12.9
Funded by a state or local government	5.0	6.7	5.8
Funded by another source	2.7	5.1	3.8
Funded by **any** of the above sources	(42.7)	(52.7)	(47.3)
Other key research role (but not as designated PI) on an NIH project	32.9	30.3	31.7
Other key research role (but not as designated PI) on project funded by any sponsors (listed below) other than the NIH			
Funded by a federal agency	8.7	9.7	9.1
Funded by a private nonprofit	6.3	7.2	6.7
Funded by a private for-profit	6.3	7.2	6.7
Funded by a state or local government	1.9	2.2	2.1
Funded by another source	1.6	2.5	2.0
Funded by **any** of the above sources	(19.4)	(23.4)	(21.3)
No involvement in externally funded research	na	28.0	12.5

na = Not applicable

Another frequently asked question concerns the overall involvement of biomedical scientists in funded research. Although applicants for NIH research grants are not representative of all biomedical investigators, they provide some insight into this question, particularly with regard to those in academic institutions (Figure 2). Approximately four-fifths (79 percent) of the FY 1994 applicants reported being independent investigators on externally funded research projects -- over half on NIH grants and another 24 percent on grants awarded by other sponsors. Although not the designated PI on any research grant, nine percent were either a collaborator, co-investigator, or other key staff member on a funded project,

distant second and third. This high level of endorsement about the helpfulness of reviewers' input for this decision contrasts with the less positive views of unfunded applicants regarding the usefulness of such comments both in general and in understanding the funding decision of the NIH.

INVOLVEMENT IN RESEARCH

One question of frequent interest regards the extent to which unfunded applicants remain involved in research. Because the NIH is the largest federal sponsor of biomedical research, it is often believed that those who are not PIs on NIH research projects may be more likely to not conduct research. This section examines whether the lack of NIH funding is synonymous with lower participation in research. It also describes the extent to which applicants reported being involved as PIs and in other key roles on research projects, including both those supported by the NIH and by other sponsors.[22]

Across all respondents, only 13 percent were *not* involved in any externally funded research. More than half (55 percent) of FY 1994 applicants were PIs on NIH grants, and 47 percent were PIs on one or more projects funded by other sources (e.g., other federal agencies, private foundations, and industry).[23] Nearly one-third were involved in NIH-funded research projects (but were not the PI), and 21 percent were serving in similar roles on other externally supported research (Exhibit 16).

For those who were not PIs on NIH projects, sizable fractions reported being involved in research projects as both PIs or in other key roles.[24] Among all respondents who did not receive NIH funding by June 1997, slightly more than half were PIs on projects funded by other sponsors as compared to 43 percent of those who did receive NIH funding. This support was most typically provided by other federal agencies (21 percent), private nonprofit organizations such as foundations (21 percent), and industry (17 percent).

Not being a PI on an NIH research project also did not preclude unfunded applicants from participating in NIH-funded research. Among unfunded applicants, 30 percent indicated that they were working as co-investigators, collaborators, and in other key roles, and this figure was almost identical to that for those who also had obtained NIH research funding as a PI (33 percent). Nearly one-quarter of all unfunded respondents reported serving in such capacities on projects funded by sponsors other than the NIH.

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[22]These roles included serving as a collaborator, co-principal investigator, project manager, research associate, or consultant.

[23]Because individuals can have multiple research grants and contracts and serve in different roles, depending on the project, these percentages exceed 100 percent.

[24]In fact, only a very small minority of unfunded applicants (3 percent) reported spending *no* time in research.

may provide a broader perspective with which to gauge the appropriateness of application requirements (e.g., whether they are more burdensome or less burdensome), review processes, and the time to receive notification of funding decisions. Thus, overall satisfaction was examined separately for funded and unfunded applicants and by their current roles on research projects.

Of respondents who had been funded by the NIH, there were no statistically significant differences between those who were PIs on NIH grants and those who were PIs on both NIH and non-NIH research grants (Exhibit 18). However, views about the NIH's handling of their application did differ among unfunded applicants, based on their involvement in other externally supported research projects. High levels of dissatisfaction (over 40 percent) were expressed by those who currently served as a principal investigator on a project funded by a sponsor other than the NIH and those who were not involved with any research projects.

Exhibit 18

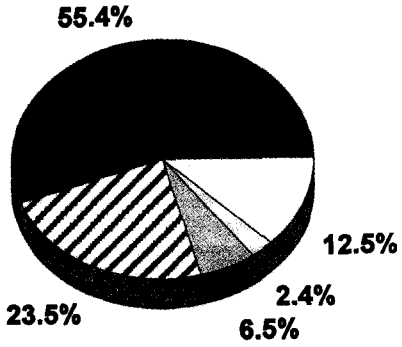
Satisfaction with the NIH review process by funding status and current roles on research projects (in percents)

Role	**Funded**[a]			
	Satisfied	Mixed	Dissatisfied	# of Respondents
PI on NIH research grant	54.9	33.0	12.1	731
PI on NIH research grant and served in another key research role on a non-NIH project	62.1	24.9	13.0	115
Role	**Not funded**[b] (χ^2 = 15.82, df = 6, $p < 0.01$)			
	Satisfied	Mixed	Dissatisfied	# of Respondents
PI on non-NIH research project	20.1	39.1	40.7	439
Served in a key research role on NIH project (co-investigator or collaborator)	27.9	45.2	26.9	122
Served in a key research role on any non-NIH project (co-investigator or collaborator)	27.5	41.3	31.3	34
Not involved in any research projects as PI or in another key research role	24.1	31.2	44.7	188

[a]Entries in the table are hierarchical and mutually exclusive. That is, for the comparison of funded applicants, if a respondent was only a PI on an NIH research project, that individual is counted only in the first row; if a respondent also was a PI or served in another key research role on a project other than one funded by the NIH, that individual is counted only in the second row.

[b]In the comparison of unfunded applicants, a respondent who was a PI on a non-NIH research project was counted only in the first row regardless of his or her involvement in key roles on other projects. If a respondent was not a PI on research projects but was in another key research role on an NIH-funded project, that individual was counted only in the second row. If a respondent was neither a PI on an external research project nor had a key role on an NIH research grant but was a co-investigator on research sponsored by another organization, that individual was counted only in the third row. Finally, if a respondent was not involved with any research projects, that individual was counted only in the fourth row.

Figure 2. Current Involvement in Externally Funded Research



NIH research support as a PI
Research support as a PI (but not a PI on an NIH research grant)
No support as a PI but serve in another key role on an NIH research grant
No involvement on an NIH grant but serve in another key role on a non-NIH research grant
No involvement in externally funded research projects

including 7 percent on an NIH grants and 2 percent on non-NIH awards. Thus, nearly 90 percent of respondents reported being currently involved at some level in externally funded research, and NIH research dollars supported a sizable fraction of this participation.

Whether an applicant had received NIH funding by June 1997 also was associated with the percentage of time that he or she currently spent conducting research. Only 37 percent of the funded applicants reported spending less than 60 percent of their time on research, compared with nearly three-fifths of the unfunded applicants (Exhibit 17).

Exhibit 17

Time currently spent on research by funding status (in percents)

Amount of Time Currently Spent Conducting Research ($\chi^2 = 59.27$, df = 1, $p < .001$)	Funded by June 1997	Not funded by June 1997
Less than 60 percent	37.3	59.4
60 percent or more	62.7	40.6

Involvement in Research and Overall Satisfaction

Not only do experiences with the NIH affect individuals' satisfaction levels but those related to interactions with other potential and current research sponsors also may affect their views about the NIH's policies for research support. For example, applying as an independent investigator to other organizations

Exhibit 19

Overall satisfaction with how the NIH handled application by career satisfaction and optimism (in percents)

Opinion	Satisfied	Mixed	Dissatisfied	# of Respondents
There are many opportunities for career advancement and growth in current position (χ^2 = 19.95, df = 4, p < .001)				
Agree	46.1	34.9	19.0	924
Neutral	35.2	36.4	28.4	438
Disagree	36.2	33.6	30.1	402
I am optimistic about the career opportunities for someone with my training and skills (χ^2 = 38.61, df = 4, p < .001)				
agree	46.8	33.0	20.3	919
Neutral	39.3	42.7	18.0	391
Disagree	31.6	32.2	36.3	468
At this point in my career, I am basically satisfied with where I am and what I am doing (χ^2 = 40.88, df = 4, p < .001)				
Agree	46.6	33.5	19.9	1,161
Neutral	33.9	42.1	24.0	317
Disagree	28.0	32.4	39.6	310
My primary position is permanent and has job security [a] (χ^2 = 14.37, df = 4, p < .01)				
Agree	43.2	35.1	21.7	1,344
Neutral	39.1	31.9	28.9	186
Disagree	33.3	36.2	30.5	241

[a] See footnote 27.

When examined according to whether applicants had received NIH funding by June 1997, an interesting pattern is evident. Funded applicants with varying levels of career satisfaction did not differ significantly with regard to their views about with the NIH application and review process. Unfunded applicants, however, who were more likely to be working in positions which were viewed as temporary. and having little job security were more likely to be dissatisfied with the NIH than their funded counterparts (Exhibit 20). Those without NIH funding and who were less satisfied with their careers and more pessimistic with regard to future career opportunities also held similar sentiments with regard to how well the NIH handled their application.

CAREER SATISFACTION

Given the recent concern expressed over the increasingly competitive nature of research and the viability of a long-term career as an independent research scientist, the survey posed a small number of questions designed to measure career satisfaction, stability, and optimism about future opportunities.[25] Differences in these beliefs and perceptions, coupled with their success in obtaining NIH research support, may color respondents' assessment of the NIH's handling of their research application.

In general, most respondents appeared satisfied with their career status, as shown by their level of agreement with the following statements:[26]

- *There are many opportunities for career advancement and promotion in my current position* (53 percent agreed, 25 percent neither agreed nor disagreed, and 23 percent disagreed)
- *I am optimistic about the career opportunities for someone with my training and skills* (51 percent agreed, 22 percent neither agreed nor disagreed, and 27 percent disagreed)
- *At this point in my career, I am basically satisfied with where I am and what I am doing* (65 percent agreed, 18 percent neither agreed nor disagreed, and 17 percent disagreed)
- *My primary position is permanent and has job security*[27] (76 percent agreed, 10 percent neither agreed nor disagreed, and 14 percent disagreed)

Still, approximately one of four respondents expressed some level of disenchantment or pessimism with regard to current career opportunities, and nearly one in five voiced some dissatisfaction with his or her current status and responsibilities. Because no data on earlier cohorts are available to examine changes in these perceptions over time, it is difficult to know whether these levels signify more or less frustration and concern among biomedical investigators.

When these career satisfaction measures were compared against respondents' satisfaction with the NIH application and review process, significant differences emerged. For all four measures of career satisfaction, respondents who were more satisfied with their career were also significantly more likely to be satisfied with the NIH application and review process (Exhibit 19). With regard to career opportunities and job stability, those who were neutral or who disagreed were quite similar in their higher levels of dissatisfaction with the NIH.

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[25]As previously reported, only a minority of respondents reported that their job was "not related" to their training and thus may be working in a non-science area.

[26]The survey presented a 5-point scale ranging from "strongly agree" to "strongly disagree." For purposes of analysis, the 5-point scale was collapsed into three categories.

[27]The survey question was worded, "My position is temporary, with little or no job security." For purposes of analysis presented this report, the statement and its associated responses have been inverted to make them comparable with other statements that measure respondents' satisfaction with their career status.

Exhibit 20 (continued)

Overall satisfaction with how the NIH handled application, by funding status and career measures (in percents)

Opinion	Satisfied	Mixed	Dissatisfied	# of Respondents
My primary position is permanent and has job security [a]				
Funded applicants				
Agree	57.1	31.6	11.3	764
Neutral	62.2	28.7	(b)	88
Disagree	47.5	32.4	20.0	117
***Unfunded* applicants** (χ^2 = 13.19, df = 4, p < .05)				
Agree	24.9	39.6	35.5	580
Neutral	18.4	34.8	46.8	98
Disagree	14.4	39.8	45.8	124

[a]See footnote #27.

[b]Unweighted cell size = 5.

IMPROVEMENTS IN THE NIH APPLICATION AND REVIEW PROCESS

In addition to having a sense of applicants' overall satisfaction levels, suggestions regarding specific improvements, particularly from a representative sample of investigators, can aid in understanding what types of changes may be most preferred by applicants. Respondents were asked for recommendations for ways in which the NIH application and review process could be improved. Among all respondents, 54 percent provided one or more suggestions or observations (Exhibit 21). Of those who identified areas for improvement, 56 percent mentioned the application process (forms, requirements, and procedures). Included were comments such as the following:

- "Have the forms available electronically in various word processing formats."
- "Shorten the length of the grants to 5 pages."
- "If application is missing something, let applicant know rather than trashing application."
- "Use the 'just in time' approach for R01s."

Looking at the review process, reviewers' expertise and understanding of submitted proposals was mentioned by almost one-third of those with recommendations. Other specific areas eliciting comments

Exhibit 20

Overall satisfaction with how the NIH handled application, by funding status and career measures (in percents)

Opinion	Satisfied	Mixed	Dissatisfied	# of Respondents
There are many opportunities for career advancement and growth in current position				
Funded applicants				
Agree	60.0	31.7	8.2	539
Neutral	50.4	33.7	15.9	229
Disagree	54.7	28.1	17.1	191
Unfunded applicants				
Agree	26.7	39.2	34.1	385
Neutral	18.6	39.2	42.2	209
Disagree	19.5	38.6	41.9	211
I am optimistic about the career opportunities for someone with my training and skills				
Funded applicants				
Agree	61.2	29.0	9.8	546
Neutral	49.9	38.9	11.2	230
Disagree	52.1	30.0	17.9	193
Unfunded applicants ($\chi^2 = 24.42$, df = 4, $p < .001$)				
Agree	25.7	38.7	35.7	374
Neutral	24.2	48.0	27.8	161
Disagree	17.2	33.7	49.1	275
At this point in my career, I am basically satisfied with where I am and what I am doing				
Funded applicants				
Agree	58.9	29.6	11.5	715
Neutral	48.9	41.0	10.1	153
Disagree	51.4	31.5	17.2	109
Unfunded applicants ($\chi^2 = 22.50$, df = 4, $p < .001$)				
Agree	26.8	39.7	33.5	446
Neutral	19.9	43.1	37.0	164
Disagree	15.3	33.0	51.7	201

Exhibit 21 (continued)

Recommendations for improvements in application and review process (n = 1031)[a]

Area for Improvement *(sample comments are indicated in italics)*	Number	Percent
Continuity of review *Submitted similar grants, received dramatically different scores.* *Reviews on subsequent submissions were not consistent with previous comments* *Major problem is that you revise to meet one set of criticisms, then different review group criticizes some of the asked-for revisions* *New reviewers should NOT place application in double jeopardy, especially if original criticisms have been responded to*	36	3.5
Opportunity to respond to reviewers/decisions *Communicate more with PI to clarify issues before decision.* *Provide a means for rapidly responding to mistaken concerns of reviewers (a few months rather than a year)* *Needs to be a way to dialogue with committee over changes that they believe are necessary but easy--a re-review mechanism 30 days later*	57	5.5
Time between submission and funding decision *Need expedited review process.* *Get pink sheet back quicker so revisions can be done on a timely basis* *The whole process from submission to award should be 6, not 10, months* *Priority score should be received in enough time to turn the application back in with revision by the next funding deadline*	148	14.4
Other comments on reviewers or review process *Consider greater use of ad hoc reviewers* *Turn over the membership of the study section more frequently* *Reduce the number of grants reviewed by study section members* *Have a better way of evaluating reviewers* *Change the reviewing system so that the primary and/or secondary reviewers cannot damn a proposal* *Go to the NSF system of expert reviewers by mail*	124	12.0
NIH staff roles and behaviors *Project officers have been helpful* *Some SRAs are helpful while others are not* *Make program officers more accessible* *Allow more interaction with staff before submission*	8	0.8
Other comments or suggestions on the NIH *Realize that training clinicians is just as important as training researchers* *Increase RFAs that deal with primary care issues* *NIH should be more supportive to those starting their career as researchers* *Make NIH publications such as NIH newsletters available to unfunded investigators*	59	5.7
Other comments[b] *Risk in academic research career is too great, and chances for success are diminishing* *Opportunities for funding are greater outside NIH these days; therfore, it is more effective to spend time preparing proposals for other sources* *Clinical, teaching, and administrative duties have taken over my life* *The inconsistency of federal funding to the NIH is a problem, along with supporting targeted research instead of simply supporting good research*	244	23.7

[a]Multiple responses were allowed.

[b]These comments could not be classified into the above categories.

addressed the fairness of the review (15 percent) and the length of time between submitting the application and receiving the funding decision (14 percent).

Exhibit 21

Recommendations for improvements in application and review process (n = 1031)[a]

Area for Improvement *(sample comments are indicated in italics)*	Number	Percent
Preliminary application process *Change format to much shorter applications for rapid review and decision that a more detailed proposal is warranted* *Have a preliminary application process to assess the general interest and fundability of a grant proposal*	60	5.8
Application process *Simplify the length of the applications to 5 pages* *Delete all forms that are only necessary if grant is actually funded.* *Go to electronic submission.* *Encourage PIs to talk with NIH officials regarding chances of success* *Have no deadlines or more frequent cycles*	580	56.2
Assignment to study section *Have applicant specify the appropriate review panel* *Help applicant in determining the appropriate review body (e.g., provide more information on reviewers)* *Discuss assignment with applicants, particularly for interdisciplinary applications*	66	6.5
Reviewers' expertise and understanding of proposal *Seek out the most appropriate and expert reviewers in specific research area or methodology (e.g., patient-oriented research, health services research, statistical genetics)* *Need more appropriate reviewers* *From the reviewers' comments, it was clear that some did not read the entire application or read it carefully* *Comments often do not permit meaningful re-working of the grant*	325	31.6
Fairness of review and use of criteria other than "merit" *System should be more closely monitored to prevent abuses and conflicts of interest..* *Less politicized review process* *Blind reviewer to source of application* *The study sections have become "clubs" and only "extended" members get funded* *Instruct reviewers to set aside their own theoretical preferences and be more objective on merit of proposal*	155	15.1
Reviewers' attitude toward new ideas *Consider funding projects that are creative.* *Make originality and innovation an important criterion* *Look for innovation as opposed to safe research*	26	2.5
Usefulness of reviewers' comments *My last review was vague, lacking specific criticisms* *Reviewers should communicate better how proposals could realistically be improved* *Lack of consensus by the reviewers, which was left to be resolved by the PI without full knowledge of the disagreement*	37	3.6

Exhibit 22 (continued)

Extent to which progress in research is currently hindered by various factors (in percents)[a]

Factor	A Great Deal	Some	Only a Little	Not at All	# of Respondents
Inadequate research equipment or computing resources	5.2	21.8	25.2	47.8	1,745
Time spent on writing research grant proposals and applications	34.3	42.0	17.2	6.5	1,789
Teaching, patient care, administrative, or other work responsibilities	20.9	36.2	27.3	15.7	1,714
Unavailability of data or unique biological materials	2.2	10.3	28.5	59.1	1,604
Lack of colleagues at institution with similar research interests	7.7	19.1	25.7	47.6	1,753
Unavailability of funds for collecting pilot data or conducting preliminary research	30.4	31.2	19.7	18.7	1,783

[a]Tests of statistical significance were not conducted for data in Exhibit 22.

These factors were viewed by funded and unfunded respondents as having differential import on their research progress (Exhibit 23). Unfunded applicants were more likely than funded applicants to say that their research progress was hindered "a great deal" by the amount of time they spent writing proposals (41 versus 29 percent), the lack of funds for preliminary research (44 versus 19 percent), and other competing work demands (29 versus 14 percent); the lack of colleagues with similar research interests also was more often cited as a key factor, but the percentages were considerably smaller (10 versus 6 percent). Funded applicants, on the other hand, identified shortages of qualified research personnel as hindering their research progress "some" or "a great deal" more frequently than unfunded applicants did (61 percent versus 53 percent, respectively).[28]

[28]Analysis of these factors by funding status and satisfaction with the NIH grants application and review process are presented in Exhibits C-6 through C-14 in Appendix C.

Recommendations from different subgroups of respondents were quite similar, when comparing those from M.D.s versus Ph.D.s, first-time versus previous applicants, and those who submitted applications to ADAMHA Institutes versus those who submitted applications to other NIH Institutes (Exhibits C-16 through C-23, Appendix C). They also did not seem strongly associated with respondents' overall satisfaction regarding the way that the NIH handled their applications.

Once again, differences in the areas identified for improvement were restricted to applicants' funding status. Predictably, those who were funded by FY 1997 more frequently focused their recommendations on the application process (43 percent versus 32 percent, respectively). This remained true when examining first-time and previous applicants by funding status separately. Among first-time applicants, a larger percentage of those who were funded suggested that the time between the submission and the funding decision should be shortened (18 percent) as compared to their unfunded counterparts (7 percent). Recommendations about the need for more expert reviewers came more often from applicants who received funds from another source (31 percent) and those who received no support (24 percent), when compared with those who received NIH support (18 percent).

Perceived Obstacles to Research

In order to understand other types of factors which may slow or even detour investigators' research programs, respondents were asked the degree to which nine generic factors hindered their research progress (Exhibit 22). Most frequently mentioned as negatively affecting their progress "a great deal" were the time spent on seeking external research support (34 percent) and the lack of funds for collecting pilot data or preliminary research, which also is often related to pursuing research funds (30 percent). Approximately one fifth identified the lack of capable graduate students, shortages of qualified postdoctoral fellows and other research personnel, and the demands imposed by other work responsibilities (e.g., teaching and patient care) as substantially impeding their research efforts.

Inadequate research facilities, space, equipment, or computing resources were viewed as less problematic; one quarter indicated their having "a great deal" *or* "some" adverse impact, but about half indicated no effect at all on their research . The unavailability of data or unique biological materials, which has been perceived as a growing problem for some research areas during the past few years, was viewed by only a minority of applicants as somewhat or greatly handicapping their research (13 percent).

Exhibit 22

Extent to which progress in research is currently hindered by various factors (in percents)[a]

Factor	A Great Deal	Some	Only a Little	Not at All	# of Respondents
Shortages of capable graduate students	19.9	34.7	19.6	25.8	1,658
Shortages of qualified research personnel, including postdoctoral fellows and trainees	21.2	36.1	18.4	24.3	1,737
Inadequate research facilities or research space	6.6	19.3	23.4	50.8	1,748

Exhibit 23 (continued) **Extent to which progress in research is currently hindered by various factors by funding status (in percents)[a]**					
Factor	A Great Deal	Some	Only a Little	Not at All	# of Respondents
Lack of colleagues at institution with similar research interests (χ^2 = 9.30, df = 3, p < .05)					
Funded	5.9	17.6	26.9	49.6	965
Not funded	9.8	21.0	24.1	45.1	788
Unavailability of funds for collecting pilot data or conducting preliminary research (χ^2 = 98.03, df = 3, p < .001)					
Funded	19.1	32.5	24.8	23.6	968
Not funded	43.7	29.6	13.7	13.0	815

[a]Unweighted cell size = 9.

CONCLUSIONS AND IMPLICATIONS

In general, reactions to the NIH review and application process by former applicants leaned more toward satisfaction than dissatisfaction. Contrary to popular perceptions that satisfaction differs substantially for certain types of NIH "customers" (e.g., biomedical versus behavioral scientists), the results showed quite similar sentiments for M.D.s versus Ph.D.s; biomedical versus behavioral science Ph.D.s; first-ever versus previous applicants; and those who applied to one of the three former ADAMHA Institutes versus another NIH Institute. In fact, the lack of differences in overall satisfaction with how the NIH handled their applications as well as for specific components of the process is one of the notable findings of this survey.

As would be expected, the major difference in satisfaction was between those who had not received an NIH research award by June 1997 as compared to their funded counterparts. The percentage of unfunded applicants who were dissatisfied (39 percent) was more than three times larger that found for funded applicants (12 percent). In addition to expressing negative views regarding the application and review process as a whole, unsuccessful applicants were more dissatisfied with several specific elements of the process (e.g., the assignment of the application to a review group, the reviewers' expertise, and the usefulness of the reviewers' comments). The one area in which funded and unfunded applicants shared similar opinions concerned the time required to receive the summary statement and learn of the final funding decision.

The timeliness of the "pink sheet" and notification of the NIH's funding decision, in fact, elicited the strongest views across all components, and it also was an area identified for improvement by a notable proportion of respondents when asked specifically for ways in which the NIH could improve the application and review process. This issue does not seem to be specific to the NIH, emerging as a common theme among scientists who apply for external research support. For example, the results of a recent National Science Foundation customer satisfaction survey of their 1995 grant applicants also identified that decreasing the time required for learning the final funding decision was important.

Exhibit 23
Extent to which progress in research is currently hindered by various factors by funding status (in percents)[a]

Factor	A Great Deal	Some	Only a Little	Not at All	# of Respondents
Shortages of capable graduate students					
Funded	21.4	36.2	17.3	24.9	928
Not funded	18.0	32.7	22.4	26.9	730
Shortages of qualified research personnel, including postdoctoral fellows and trainees ($\chi^2 = 8.45$, df = 3, $p < .05$)					
Funded	23.0	38.2	16.9	22.0	972
Not funded	19.0	33.5	20.3	27.2	765
Inadequate research facilities or research space					
Funded	6.2	18.6	23.6	51.2	968
Not funded	6.9	20.2	23.1	49.8	780
Inadequate research equipment or computing resources					
Funded	5.1	21.3	26.3	47.2	967
Not funded	5.3	22.4	23.8	48.5	778
Time spent on writing research grant proposals and applications ($\chi^2 = 17.73$, df = 3, $p < .001$)					
Funded	29.2	43.9	20.0	6.9	984
Not funded	40.5	39.6	13.8	6.1	804
Teaching, patient care, administrative, or other work responsibilities ($\chi^2 = 46.79$, df = 3, $p < .001$)					
Funded	13.9	38.3	31.3	16.5	945
Not funded	29.4	33.6	22.3	14.7	769
Unavailability of data or unique biological materials					
Funded	(a)	10.7	29.2	58.8	896
Not funded	3.2	9.8	27.6	59.4	708

streamlining the application process, improving the review process, and reducing the time between submission and award. Third, the survey identified some additional areas which might benefit from further discussion by the NIH, such as informing certain groups of applicants as to the value of contacting NIH staff to discuss an unfavorable funding decision. Fourth, there are now baseline data which can be used for comparison in future customer satisfaction surveys -- efforts which are increasingly being requested of both public and private organizations. Finally, the findings on external research support as both a PI and in other key roles provide some insight as to the adequacy with which receipt of an NIH research grant, a measure which is readily available and is used frequently as an outcome measure for some NIH programs, captures success as an independent investigator and overall involvement in research.

Another area targeted by respondents for improvement, particularly those who had been successful in obtaining NIH research support, was the need to streamline the application process. Suggestions frequently identified being able to submit applications electronically and to require less information in grant applications (e.g., budgetary information). In fact, some changes recently implemented or being currently considered by the NIH (e.g., modular budgeting, electronic submission, and "just-in-time" initiatives) are ones that may be responsive to these recommendations put forward by survey respondents.

Ways to further facilitate contact between unsuccessful applicants and NIH program and review officials also may be an area that might benefit from discussion. Although unfunded applicants are encouraged to contact the NIH to learn more about why their proposal was not awarded funds, nearly two fifths of these individuals did not do so with regard to their FY 1994 application. The primary reason was that they believed that this contact would not be helpful (80 percent). At the same time, 20 percent said that they did not know that there was such an option. Because previous applicants took advantage of this option more often than did first-time applicants (60 versus 46 percent, respectively), this suggests that additional ways of alerting applicants about this option may be useful, particularly for young investigators.

Applicants' perceptions about factors which impede their research progress may provide some additional information with regard to where the NIH could consider ways to fine-tune its extramural programs or develop new initiatives. About three fifths of all applicants cited the unavailability of funds for collecting pilot data as adversely affecting their research "a great deal" or "some". This was particularly true for unfunded applicants (73 percent), although over half (52 percent) of funded applicants expressed the same sentiments. Thus, efforts to assist this preliminary stage of research should be welcomed by investigators seeking outside research support. It also was the case that more than half of the applicants indicated shortages of qualified graduate students and research personnel to hinder their research progress to some or a great degree. This suggests that the extent to which future policies regarding the use of graduate students and postdoctoral fellows on NIH-funded projects address this problem may be one factor affecting the type of reception they receive from the research community.

Another objective of the survey was to obtain a more complete picture of applicants' involvement in research regardless of their funding status at the NIH. Here, it was found that very few individuals overall have abandoned the research enterprise and spend no time at all in research. Even among unfunded applicants, a substantial fraction reported being PIs on non-NIH research projects or serving in other key research roles on NIH or non-NIH research grants. Overall, the overwhelming majority of respondents (89%) were participating in one or both of these ways in externally funded research efforts. The survey results do, however, reinforce the major role that the NIH occupies in scientists' careers. Across all respondents, over half (55 percent) were PIs on an NIH research grant, and another 6 percent, although not a PI, were in other key research roles on NIH-funded research projects.

In conclusion, the results of this survey are useful in at least five ways. First, the survey is the first NIH-wide, systematic data collection effort on applicant opinions since a 1978 study by the Rand Corporation which included interviews of a sample of unfunded investigators. One benefit of this study is that it provided empirical support to some staff perceptions, lending additional credibility to more anecdotal evidence (e.g., the importance of being awarded a grant to subsequent satisfaction levels); in other cases, it showed that some perceived differences between different groups of applicants may not exist or be less strong than believed (e.g., the satisfaction of biomedical versus behavioral scientists). Second, the results which pertained to applicants' preferences confirm that the NIH's current efforts to improve the grant application and review process are on the "right track" -- i.e., efforts aimed at

Appendix A

Survey Instrument

Survey of Applicants for R01 and R29 Grants

Conducted by Macro International Inc. for the
National Institutes of Health

Public reporting burden for this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Project Clearance Office, National Institutes of Health, Rockledge 2, MSC 7730, 6701 Rockledge Drive, Room 2196, Bethesda, MD 20892-7730.

National Institutes of Health

Survey of Applicants for R01 and R29 Grants

Part A - Experiences with the FY 1994 NIH Application and Review Process

We are interested in your views about how the NIH handled the R01 or R29 research grant application that you submitted in fiscal year (FY) 1994, that is, between October 1, 1993 and September 30, 1994. If you submitted more than one R01 or R29 application during FY 1994, please answer the questions with respect to the last application you submitted during this period.

Q-1. **Was the application you submitted between October 1, 1993 and September 30, 1994, the first NIH research grant application for which you were the principal investigator (PI)?**

1 [ ] Yes
2 [ ] No
3 [ ] Did not submit R01 or R29 application during this time period. ——> ***Go to Q-33 on Page 11***

Q-2. **Did the NIH award funds based on the review that was conducted for this application?**

1 [ ] Yes ——> ***Go to Q-10 on Page 4***
2 [ ] No

Q-3. **Did you contact a program or review official at the NIH to discuss the reasons for not receiving an award?**
Check (✓) all that apply.

1 [ ] Yes, I contacted a program official at the NIH.
2 [ ] Yes, I contacted a review official at the NIH.
3 [ ] No, I did not contact any NIH official.——> ***Go to Q-5 on Page 3***
9 [ ] I don't remember. ——> ***Go to Q-6 on Page 3***

Q-4. **How much did the comments of the NIH official(s) help you understand why an award was not made?**

1 [ ] A great deal
2 [ ] Some
3 [ ] Only a little
4 [ ] Not at all
} ——> ***Go to Q-6 on Page 3***
9 [ ] Don't remember

Q-5. **Why did you decide not to contact a NIH program or review official to discuss why no award was made?**

Check (✓) all that apply.

1 [ ] Did not know whom to contact
2 [ ] Did not believe that this would be helpful
3 [ ] Did not think that contacting an NIH official was an option
4 [ ] Other (*specify*):

_____

_____

Q-6. **What did you subsequently do with this application?**

Check (✓) all that apply.

1 [ ] I substantially revised and resubmitted it as an amended application to the NIH.
2 [ ] I made only minor revisions and resubmitted it as an amended application to the NIH.
3 [ ] I made substantial revisions and submitted it to a funding source other than the NIH.
4 [ ] I made no or only minor revisions and then submitted it to a funding source other than the NIH.
5 [ ] I took no further action on the application.
6 [ ] Other (*specify*):

_____

_____

Q-7. **To what degree did each of the following factors influence your decision regarding what you did with your application?**

Circle one for each.

	Degree of Influence				
	A Great Deal	Some	Only a Little	Not at All	Don't Remember
a. Written comments of the reviewers	1	2	3	4	9
b. Comments or advice from one or more NIH officials	1	2	3	4	9
c. Comments or advice from other colleagues	1	2	3	4	9
d. Other (*specify*): _____	1	2	3	4	9

Q-8. *Answer only if you submitted an amended application to the NIH:*

Was this amended application or a subsequent revision awarded funds by the NIH?

1 [ ] Yes
2 [ ] No

Q-9. **Please indicate (1) whether you requested funds for this research project from one or more sources other than the NIH and IF YES (2) whether any of these sources awarded funds for this proposed research.**

Check (✓) all that apply.

[ ] **I did not request funds for this project from any other source.** ——> *Go to Q-10 below*

	(1) Requested funds from:	(2) Was awarded funds by: Yes	No
1. **A federal agency (other than the NIH):**			
a. Agriculture Department	[ ]	[ ]	[ ]
b. Defense Department (DoD)	[ ]	[ ]	[ ]
c. Energy Department (DoE)	[ ]	[ ]	[ ]
d. National Science Foundation (NSF)	[ ]	[ ]	[ ]
e. Veterans Administration (VA)	[ ]	[ ]	[ ]
f. Other federal agency *(specify)*: _____	[ ]	[ ]	[ ]
2. **A private nonprofit foundation or charitable organization:**			
a. American Cancer Society	[ ]	[ ]	[ ]
b. American Heart Association and its affiliates	[ ]	[ ]	[ ]
c. Howard Hughes Medical Institute	[ ]	[ ]	[ ]
d. Other private foundation or charitable organization *(specify)*: _____	[ ]	[ ]	[ ]
3. **A private for-profit company or business**	[ ]	[ ]	[ ]
4. **A state or local government agency**	[ ]	[ ]	[ ]
5. **Other source not mentioned above** (*specify*): _____	[ ]	[ ]	[ ]

Part B - Experiences with the NIH Application and Review Process in FY 1994 and Subsequent Years

The questions in this section ask for your opinions about the NIH research grant application and review process, based on your experiences from FY 1994 to the present.

Q-10. **Since September 30, 1994, have you submitted other new or competing renewal research grant applications to the NIH as a principal investigator?**

1 [ ] Yes

2 [ ] No

9 [ ] Don't remember

Q-11. **Considering all your experiences in applying to the NIH in FY 1994 and later, how satisfied or dissatisfied have you been with the review process in terms of:**

Circle one for each.

Level of Satisfaction or Dissatisfaction

	Completely Satisfied	Mostly Satisfied	Mixed	Mostly Dissatisfied	Completely Dissatisfied	Don't Remember
a. The appropriateness of the scientific peer review group	1	2	3	4	5	9
b. The expertise of the reviewers	1	2	3	4	5	9
c. The reviewers' understanding of the research plan, design, and methodology	1	2	3	4	5	9
d. The usefulness of the reviewers' comments	1	2	3	4	5	9
e. The time it took to receive the summary statement ("pink sheet") from the NIH	1	2	3	4	5	9
f. The time it took to find out the funding decision by the NIH	1	2	3	4	5	9
g. The helpfulness of the reviewers' comments in understanding the funding decision made by the NIH	1	2	3	4	5	9
h. The fairness of the NIH's funding decision	1	2	3	4	5	9

Q-12. **Describe any other factors that have contributed to your satisfaction or dissatisfaction with the review process.**

Q-13. **Overall, how satisfied or dissatisfied have you been with how the NIH handled your application(s)?**

1 [ ] Completely satisfied
2 [ ] Mostly satisfied
3 [ ] Mixed—equally satisfied and dissatisfied
4 [ ] Mostly dissatisfied
5 [ ] Completely dissatisfied
9 [ ] Don't remember

Q-14. **In your opinion, what should the NIH do to improve the process for preparing and submitting research grant applications?**

Q-15. **In your opinion, what should the NIH do to improve the process for reviewing research grant applications?**

_____

_____

_____

Part C - Employment and Work Activities in FY 1994 and Currently

The questions in this section seek to obtain more information about the broader context in which applicants work and apply for research funds.

Please answer the following questions with regard to: (1) your employment when you submitted your FY 1994 application and (2) your current employment circumstances.

	FY 1994	Current
Q-16. **Were/Are you working for pay (or profit)?** *(Also include a postdoctoral appointment, self-employment, or employment from which you were temporarily absent because of illness, parental leave, or vacation.)*	1 [ ] Yes 2 [ ] No	1 [ ] Yes 2 [ ] No
Q-17. *If you were/are not working*: **Were/Are you looking for work?**	1 [ ] Yes 2 [ ] No	1 [ ] Yes 2 [ ] No
Q-18. **Counting all the jobs that you held/hold, did/do you usually work 35 hours or more per week?**	1 [ ] Yes 2 [ ] No	1 [ ] Yes 2 [ ] No
Q-19. *If you worked/work fewer than 35 hours per week:* **Did/Do you want to work a full-time work week of 35 or more hours?** . . .	1 [ ] Yes 2 [ ] No	1 [ ] Yes 2 [ ] No

Please answer Q-20 through Q-26 for your PRIMARY or PRINCIPAL job or employment position.

Q-20. **Was/Is your primary position a postdoctoral appointment?** *A postdoctoral appointment is a temporary position in a university, industrial, or government setting that is aimed primarily at providing continuing education or training in research* . . . . . .

FY 1994	Current
1 [ ] Yes	1 [ ] Yes
2 [ ] No	2 [ ] No

Q-21. **Who was/is your principal employer?**

FY 1994 _____

Current _____

Q-22. **Which category best describes the type of your principal employment or postdoctoral appointment?** *Choose one for FY 1994 and one for current.*

FY 1994	Current	
1 [ ]	1 [ ]	Self-employed
2 [ ]	2 [ ]	Business or industry
3 [ ]	3 [ ]	Medical or other health professions school, including university-affiliated hospital or medical center
4 [ ]	4 [ ]	University, other than a medical or health professions school
5 [ ]	5 [ ]	University-affiliated research institute
6 [ ]	6 [ ]	Four-year college
7 [ ]	7 [ ]	Junior college, two-year college, or technical institute
8 [ ]	8 [ ]	Hospital or clinic not affiliated with a university
9 [ ]	9 [ ]	Private foundation
10 [ ]	10 [ ]	U.S. military service, active duty, or Commissioned Corps (e.g., PHS or NOAA)
11 [ ]	11 [ ]	U.S. government, civilian employee
12 [ ]	12 [ ]	State or local government
13 [ ]	13 [ ]	Elementary or secondary school
14 [ ]	14 [ ]	Other (*specify*): _____

Q-23. **Were/are you employed by an institution of higher education?**

Check (✓) all that apply.

1 [ ] Yes, in FY 1994

2 [ ] Yes, currently

3 [ ] No ——> ***Go to Q-27 on Page 8***

Q-24. **What was/is your faculty rank?** *Choose one for FY 1994 and one for current.*

FY 1994	Current	
1 [ ]	1 [ ]	Not applicable at this institution
2 [ ]	2 [ ]	Not applicable for my position
3 [ ]	3 [ ]	Professor
4 [ ]	4 [ ]	Associate professor
5 [ ]	5 [ ]	Assistant professor
6 [ ]	6 [ ]	Instructor
7 [ ]	7 [ ]	Lecturer
8 [ ]	8 [ ]	Adjunct faculty
9 [ ]	9 [ ]	Other (*specify*): _____

Q-25. **What was/is your tenure status?** *Choose one for FY 1994 and one for current.*

FY 1994	Current	
1 [ ]	1 [ ]	Not applicable; there was/is no tenure system at this institution
2 [ ]	2 [ ]	Not applicable; there was/is no tenure system for this position
3 [ ]	3 [ ]	Tenured
4 [ ]	4 [ ]	On tenure track but not tenured
5 [ ]	5 [ ]	Not on tenure track

Q-26. **Approximately what percentage of your salary was/is guaranteed by your employer, i.e., was/is not dependent on money from research grants, revenues from patients, or other outside sources?**

FY 1994	Current
%	%

Q-27. **Looking across all your current employment positions, what percentage of your time do you spend on each of the following work activities during a typical work week?** *Entries should total to 100%.*

____ % Consulting to individuals or organizations

____ % Management or administration

____ % Patient care

____ % Research

____ % Teaching

____ % Other (*specify*): _____

100 %

Q-28. **Please indicate if you currently serve (1) as a principal investigator (PI) or (2) in another key role on any research projects that are funded by one or more of the funding sources listed below.** *Key roles include serving as a collaborator, co-principal investigator, project manager, research associate, or consultant.*

Check (✔) all that apply.

[ ] **I am not involved as a PI or in another key role on any other research projects. ——> *Go to Q-29 on Page 10***

	(1) As a Principal Investigator	(2) In Another Key Research Role
1. **One or more Institutes of the NIH**	[ ]	[ ]
2. **A federal agency (*other than* the NIH):**		
a. Agriculture Department	[ ]	[ ]
b. Defense Department (DoD)	[ ]	[ ]
c. Energy Department (DoE)	[ ]	[ ]
d. National Science Foundation (NSF)	[ ]	[ ]
e. Veterans Administration (VA)	[ ]	[ ]
f. Other federal agency *(specify)*: _____	[ ]	[ ]
3. **A private nonprofit foundation or charitable organization:**		
a. American Cancer Society	[ ]	[ ]
b. American Heart Association and affiliates	[ ]	[ ]
c. Howard Hughes Medical Institute	[ ]	[ ]
d. Other private foundation or charitable organization *(specify)*: _____	[ ]	[ ]
4. **A private for-profit company or business**	[ ]	[ ]
5. **A state or local government agency**	[ ]	[ ]
6. **Other source not mentioned above** (*specify*): _____	[ ]	[ ]

Q-29. **To what extent is progress in your own research currently hindered by:**

Circle one for each.

	Amount of Influence				
	A Great Deal	Some	Only a Little	Not at All	Not Applicable
a. Shortages of capable graduate students	1	2	3	4	9
b. Shortages of qualified research personnel, including postdoctoral fellows and trainees	1	2	3	4	9
c. Inadequate research facilities or research space	1	2	3	4	9
d. Inadequate research equipment or computing resources	1	2	3	4	9
e. Time spent on writing research grant proposals and applications	1	2	3	4	9
f. Teaching, patient care, administrative, or other work responsibilities	1	2	3	4	9
g. Unavailability of data or unique biological materials	1	2	3	4	9
h. The lack of colleagues at my institution/organization who have similar research interests	1	2	3	4	9
I. Unavailability of funds for collecting pilot data or conducting preliminary research	1	2	3	4	9
j. Other (*specify*): _____	1	2	3	4	9

Q-30. **Thinking about the relationship between your current work and your education, to what extent is the field in which you are working related to the field of your highest degree?**

1 [ ] Closely related ——————> ***Go to Q-32 on Page 11***

2 [ ] Somewhat related ——————> ***Go to Q-32 on Page 11***

3 [ ] Not related

Q-31. **Did any of the following factors influence your decision to work in an area not related to the field of your highest degree?**

Check (✓) Yes or No for each.

	Yes	No
a. Change in my career or professional interests	[ ]	[ ]
b. Location, working conditions, or pay	[ ]	[ ]
c. The inability to attract outside research funding	[ ]	[ ]
d. Family responsibilities (children, spouse's job)	[ ]	[ ]
e. Suitable job not available	[ ]	[ ]
f. Other (*specify*): _____	[ ]	[ ]

Q-32. **To what extent do you agree or disagree with the following statements?**

Circle one for each.

	Level of Agreement or Disagreement				
	Strongly Agree	**Agree**	**Neither Agree or Disagree**	**Disagree**	**Strongly Disagree**
a. My job fully utilizes the knowledge and skills acquired during my graduate and postdoctoral training	1	2	3	4	5
b. There are many opportunities for career advancement and promotion in my current position	1	2	3	4	5
c. My work is very different from what I expected to be doing when I completed my graduate and postdoctoral training.	1	2	3	4	5
d. My primary position is temporary, with little or no job security	1	2	3	4	5
e. At this point in my career, I am basically satisfied with where I am and what I am doing	1	2	3	4	5
f. I am optimistic about the career opportunities for someone with my training and skills	1	2	3	4	5

Part D - Background Information

Q-33. **Are you male or female?**

1 [ ] Male
2 [ ] Female

Q-34. **Are you of Hispanic, Spanish, or Latino origin or descent?**

1 [ ] Yes
2 [ ] No

Q-35. **Which of the groups below best describes you?**

1 [ ] American Indian/Native American
2 [ ] Asian
3 [ ] Pacific Islander
4 [ ] Black
5 [ ] White
6 [ ] Other (*specify*): _____

Q-36. **Please indicate which of these degrees apply to you and in what year you received the degree.**

Check (✓) all that apply and fill out years accordingly.

	Type of Degree	Year Degree Received
1 [ ]	D.D.S.	19_____
2 [ ]	D.V.M.	19_____
3 [ ]	M.D.	19_____
4 [ ]	Ph.D. or other research doctorate	19_____
5 [ ]	Other (*specify*): _____	19_____

Q-37. *If you earned a Ph.D. or other research doctorate*: **What was the field of this degree?**

Q-38. **In what year were you born?**

19

If you have any additional comments about any question on this survey, please write them below.

We appreciate the time and effort you have taken to answer these questions. Please mail your completed questionnaire in the enclosed envelope to:

National Institutes of Health
NIH R01 and R29 Applicant Survey
126 College Street
Burlington, VT 05401
(800) 639-3705

THANK YOU FOR YOUR PARTICIPATION

Appendix B

Information about the Sample

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Exhibit B-2. Selected characteristics of respondents and nonrespondents B-3
Exhibit B-3. Institute of FY 1994 application for respondents and nonrespondents B-4

Exhibit B-1

Stratification variables for Survey of Applicants for NIH R01 and R29 Grants

Variable	Values	Definition
Funding status	Funded by June 1997 Not funded by June 1997	These are mutually exclusive categories and indicate whether members of the cohort had received a competing research award or other research support from the NIH within about 3 years of the signal year. (Previous NIH research indicated that about 60 percent of all applicants are funded within 3 years of the signal year.)
Application history	First-time applicant Previous applicant	First-time applicants are those for whom the FY 1994 application was the first one submitted to the NIH. Previous applicants had submitted them before FY 1994, including any RPG or other research mechanism.
Highest degree	Ph.D.s and M.D./Ph.D.s M.D.s and other health profession doctorates	The category of "Ph.D.s and M.D./Ph.D.s" includes individuals who have earned a Ph.D. or doctoral equivalent (e.g., D.Sc.). They may also have another health professional degree (e.g., D.D.S., D.V.M., M.D.). The category of "M.D.s and Other Health Profession Doctorates" includes individuals who do not have research doctorates (e.g., M.D., D.V.M., D.D.S., J.D., and Ed.D).
Quality of the FY 1994 application	Top half of priority scores Bottom half of priority scores	Cutoff point is 250 or higher for being assigned to the bottom half of the distribution.
NIH funding history	Funded before FY94 Not funded before FY94	Only awards considered as Research Project Grants (RPGs) were considered as prior funding. Receipt of a predoctoral or postdoctoral traineeship or fellowship was excluded.

Exhibit B-2[a]

Selected characteristics of respondents and nonrespondents

Characteristic	Total Sample	Response Rate	Respondents		Nonrespondents	
			Number	Percent	Number	Percent
Funding status (χ^2 = 113.024, df = 1, p < .01)						
Funded by June 1997	831	88.4	735	36.3	96	14.4
Not funded by June 1997	1,863	69.3	1291	63.7	572	85.6
Highest degree (χ^2 = 20.538, df = 1, p < .01)						
Ph.D.s and M.D./Ph.D.s	1,698	78.1	1326	65.4	372	55.7
M.D.s and other health profession doctorates	996	70.3	700	34.6	296	44.3
Priority score (χ^2 = 63.527, df = 1, p < .01)						
Top half	1,176	82.7	973	48.0	203	30.4
Bottom half	1,518	69.4	1053	52.0	465	69.6
Type of FY 1994 application (χ^2 = 6.987, df = 1, p < .01)						
Clinical research	1,220	72.8	888	43.8	332	49.7
Nonclinical research	1,474	78.8	1138	56.2	336	50.3

[a] Information presented in Exhibit B-2 is for *all* sampled individuals, not just those who were reached and eligible to participate in the survey.

Exhibit B-3[a]

Institute of FY 1994 application for respondents and nonrespondents

Institute	Total Sample	Response Rate (in percents)	Number of Respondents	Number of Nonrespondents
NIAAA	54	81.5	44	10
NIA	99	70.7	70	29
NIAID	280	71.4	200	80
NIAMS	109	74.3	81	28
NCI	394	79.2	312	82
NIDA	93	76.3	71	22
NIDCD	51	66.7	34	17
NIDR	42	88.1	37	5
NIDDK	268	71.6	192	76
NIEHS	37	81.1	30	7
NEI	53	69.8	37	16
NIGMS	247	76.1	188	59
NICHD	197	72.6	143	54
NCHGR	15	73.3	11	4
NHLBI	334	77.2	258	76
NIMH	186	75.8	141	45
NINR	41	82.9	34	7
NINDS	189	73.5	139	50
NIRR	5	80.0	4	1
Total	2,694	(b)	2,026	668

[a] Information presented in Exhibit B-3 is for *all* sampled individuals, not just those who were reached and eligible to participate in the survey.

[b] As indicated in footnote #4 of the report, the cooperation rate was 85 percent and the lower bound response rate was 75 percent.

Appendix C

Supplementary Tables

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Exhibit C-1

Satisfaction with specific aspects of the review process for first-time vs. previous applicants

Characteristic	Satisfied	Mixed	Dissatisfied	Total
Assignment of application to scientific review group				
First-time applicant	48.0	31.5	20.5	311
Previous applicant	46.2	31.6	22.2	1501
Expertise of the reviewers ($\chi^2 = 7.18$, df = 2, $p < 0.05$)				
First-time applicant	45.1	37.0	17.8	308
Previous applicant	38.9	40.3	20.8	1490
Reviewers' understanding of research design ($\chi^2 = 9.84$, df = 2, $p < 0.05$)				
First-time applicant	43.5	36.8	19.7	313
Previous applicant	39.0	35.1	25.9	1502
Usefulness of the reviewers' comments ($\chi^2 = 21.24$, df = 2, $p < 0.001$)				
First-time applicant	40.2	34.6	25.2	309
Previous applicant	29.5	39.8	30.7	1498
Time to get pink sheet				
First-time applicant	43.0	20.1	36.9	306
Previous applicant	42.7	20.6	36.6	1487
Time to learn of funding decision				
First-time applicant	43.3	24.0	32.7	296
Previous applicant	43.9	23.7	32.4	1459
Helpfulness of reviewers' comments in understanding funding decision				
First-time applicant	37.7	31.0	31.2	303
Previous applicant	34.8	28.9	36.3	1464
Fairness of decision				
First-time applicant	40.6	31.0	28.4	303
Previous applicant	43.6	28.7	27.7	1477

Exhibit C-2

Satisfaction with specific aspects of the review process by highest degree

Characteristic	Satisfied	Mixed	Dissatisfied	Total
Assignment of application to scientific review group ($\chi^2 = 6.80$, df = 2, $p < 0.05$)				
M.D. and other health profession doctorate	39. 7	36.7	23.6	398
PhD	48.4	30.2	21.4	1415
Expertise of the reviewers				
M.D. and other health profession doctorate	42.0	38.7	19.3	396
Ph.D. and M.D./Ph.D.s	39.4	40.0	20.6	1402
Reviewers' understanding of the research design				
M.D. and other health profession doctorate	39.4	36.6	24.0	398
Ph.D. and M.D./Ph.D.s	39.9	35.0	25.1	1417
Usefulness of the reviewers' comments				
M.D. and other health profession doctorate	35.8	39.2	24.9	397
Ph.D. and M.D./Ph.D.s	30.1	38.8	31.1	1410
Time to get pink sheet				
M.D. and other health profession doctorate	44.1	22.2	33.7	395
Ph.D. and M.D./Ph.D.s	42.4	20.1	37.5	1397
Time to learn of funding decision				
M.D. and other health profession doctorate	44.6	28.0	27.4	382
Ph.D. and M.D./Ph.D.s	43.6	22.6	33.8	1374
Helpfulness of reviewers' comments in understanding decision				
M.D. and other health profession doctorate	37.4	31.7	30.9	390
Ph.D. and M.D./Ph.D.s	34.7	28.5	36.7	1377
Fairness of decision				
M.D. and other health profession doctorate	40.8	30.2	29.0	390
Ph.D. and M.D./Ph.D.s	43.7	28.8	27.7	1390

Exhibit C-3

Satisfaction with specific aspects of the review process by Institute of FY 1994 application

Characteristic	Satisfied	Mixed	Dissatisfied	Total
Assignment of the application to a scientific review group				
NIAAA/NIDA/NIMH	49.3	30.1	20.7	219
other institute	46.1	31.8	22.1	1594
Expertise of the reviewers				
NIAAA/NIDA/NIMH	44.1	37.1	18.8	221
Other institute	39.4	40.1	20.5	1577
Reviewers' understanding of the research design				
NIAAA/NIDA/NIMH	46.8	34.0	19.2	233
Other institute	38.8	35.5	25.6	1592
Usefulness of the reviewers' comments				
NIAAA/NIDA/NIMH	34.4	38.7	26.9	226
Other institute	30.9	39.0	30.1	1582
Time to get pink sheet				
NIAAA/NIDA/NIMH	39.7	20.9	39.3	219
Other institute	43.2	20.5	36.3	1573
Time to learn of funding decision ($\chi^2 = 8.17$, df = 2, $p < 0.05$)				
NIAAA/NIDA/NIMH	41.6	16.1	42.4	219
Other institute	44.2	24.8	31.0	1536
Helpfulness of reviewers' comments in understanding the decision				
NIAAA/NIDA/NIMH	40.8	25.1	34.0	223
Other institute	34.5	29.8	35.7	1543
Fairness of the decision				
NIAAA/NIDA/NIMH	46.9	29.4	23.7	215
Other institute	42.5	29.0	28.4	1565

Exhibit C-4

Satisfaction with specific aspects of the review process by type of research

Characteristic	Satisfied	Mixed	Dissatisfied	Total
Assignment of the application to a scientific review group				
Clinical	44.7	31.8	23.5	704
Nonclinical	47.6	31.5	20.9	1108
Expertise of the reviewers				
Clinical	41.5	37.6	20.9	694
Nonclinical	39.0	41.1	19.9	1104
Reviewers' understanding of the research design				
Clinical	41.5	34.0	24.5	702
Nonclinical	38.7	36.2	25.1	1114
Usefulness of the reviewers' comments ($\chi^2 = 8.65$, df = 2, $p < 0.05$)				
Clinical	36.6	37.0	26.4	699
Nonclinical	28.1	40.1	31.8	1109
Time to get pink sheet				
Clinical	40.9	20.1	39.0	693
Nonclinical	44.0	20.8	35.2	1099
Time to learn of funding decision				
Clinical	44.3	23.0	32.7	681
Nonclinical	43.7	24.2	32.2	1074
Helpfulness of reviewers' comments in understanding decision				
Clinical	38.2	29.4	32.4	693
Nonclinical	33.4	29.1	37.4	1074
Fairness of the decision				
Clinical	44.3	28.1	27.6	688
Nonclinical	42.3	29.7	28.0	1092

Exhibit C-5

Satisfaction with specific aspects of the review process by field of doctorate (Ph.D.s and M.D./Ph.D.s)

Characteristic	Satisfied	Mixed	Dissatisfied	Total
Assignment of the application to a scientific review group				
Biomedical	49.2	29.6	21.3	1110
Behavioral	47.7	32.3	20.0	224
Expertise of the reviewers ($\chi^2 = 9.84$, df = 2, $p < 0.05$)				
Biomedical	37.6	40.0	22.4	1100
Behavioral	49.2	38.5	12.4	221
Reviewers' understanding of the research design				
Biomedical	39.2	34.4	26.5	1111
Behavioral	47.7	34.3	17.9	226
Usefulness of the reviewers' comments ($\chi^2 = 6.46$, df = 2, $p < 0.05$)				
Biomedical	30.3	37.4	32.3	1107
Behavioral	34.3	43.6	22.1	225
Time to get pink sheet				
Biomedical	43.3	19.5	37.3	1095
Behavioral	43.1	18.6	38.3	220
Time to learn of funding decision ($\chi^2 = 6.23$, df = 2, $p < 0.05$)				
Biomedical	44.8	23.8	31.5	1076
Behavioral	40.3	16.6	43.1	216
Helpfulness of reviewers' comments in understanding the decision				
Biomedical	34.2	29.2	36.6	1074
Behavioral	42.9	26.6	30.5	221
Fairness of the decision				
Biomedical	43.8	28.5	27.8	1091
Behavioral	48.5	24.4	27.1	217

Exhibit C-6

Statistical tests for Exhibit 15: Extent of influence regarding next steps for applicants whose FY 1994 application was not funded

Comparisons	A Great Deal		Some		Only a Little		Not at all	
	z score	p value	z score	p value	z score	p value	z score	p value
Written comments of the reviewers versus comments or advice from colleagues	17.206	p < .0001	-7.477	p < .0001	-5.288	p < .0001	-10.858	p < .0001
Written comments of the reviewers versus comments or advice from NIH official(s)	21.937	p < .0001	-1.324	p = .1868	-4.532	p < .0001	-21.298	p < .0001
Comments or advice from NIH official(s) versus comments or advice from colleagues	-5.838	p < .0001	-5.781	p < .0001	-0.649	p = .5156	11.424	p < .0001

Exhibit C-7

Overall satisfaction with the NIH review process by funding status and the extent to which respondent's research is currently hindered by shortages of capable graduate students

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
Funded by June 1997[a]				
A great deal	20.0	19.5	26.7	187
Some	38.9	32.9	37.1	333
Only a little	16.4	25.1	(a)	161
Not at all	24.7	22.5	31.3	224
Not funded by June 1997				
A great deal	15.5	20.6	15.5	122
Some	34.0	35.0	31.1	233
Only a little	19.9	20.0	25.6	155
Not at all	30.7	24.4	27.9	190

[a]Due to small cell sizes, significance tests were not run on the portion of the table for "funded by June 1997."

(a) Unweighted cell size = 4.

Exhibit C-8

Overall satisfaction with the NIH review process by funding status and the extent to which respondent's research is currently hindered by shortages of qualified research personnel

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
Funded by June 1997				
A great deal	22.8	22.9	23.6	217
Some	39.3	35.8	38.5	360
Only a little	17.2	17.6	17.2	164
Not at all	20.8	23.6	20.7	205
Not funded by June 1997				
A great deal	17.8	19.2	18.6	137
Some	33.2	35.8	31.9	247
Only a little	21.7	21.8	18.0	149
Not at all	27.4	23.2	31.5	201

Exhibit C-9

Overall satisfaction with the NIH review process by funding status and the extent to which respondent's research is currently hindered by inadequate research facilities or research space

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
Funded by June 1997				
A great deal	3.6	7.6	(a)	55
Some	18.5	19.4	16.1	174
Only a little	23.4	24.5	21.9	222
Not at all	54.5	48.5	50.5	491
Not funded by June 1997				
a great deal	11.4	4.2	6.5	50
Some	22.2	22.6	17.5	154
Only a little	20.2	23.1	25.6	175
Not at all	46.2	50.2	50.5	369

[a] Due to small cell sizes, significance tests were not run on the portion of the table for funded by June 1997.

(a) Unweighted cell size = 8.

Exhibit C-10

Overall satisfaction with the NIH review process by funding status and the extent to which respondent's research is currently hindered by inadequate research equipment or computing resources

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
Funded by June 1997[a]				
A great deal	2.9	6.9	(a)	43
Some	19.7	28.6	(b)	204
Only a little	24.1	31.1	27.6	251
Not at all	53.2	33.4	53.4	444
Not funded by June 1997				
A great deal	5.5	4.6	5.6	39
Some	24.1	20.3	23.7	168
Only a little	27.8	23.7	21.3	177
Not at all	42.6	51.4	49.4	363

[a]Due to small cell sizes, significance tests were not run on the portion of the table for funded by June 1997.

(a) Unweighted cell size = 5.

(b) Unweighted cell size = 8.

Exhibit C-11

Overall satisfaction with the NIH review process by funding status and the extent to which respondent's research is currently hindered by the time spent writing research grant proposals

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
Funded by June 1997[a]				
A great deal	21.7	31.7	55.9	277
Some	43.7	51.7	29.3	426
Only a little	25.9	11.7	(b)	190
Not at all	8.6	(a)	(c)	65
Not funded by June 1997 (χ^2 = 16.06, df = 6, p < .05)				
A great deal	29.6	41.0	46.5	311
Some	45.2	40.4	34.6	302
Only a little	17.3	13.9	12.5	109
Not at all	7.9	4.7	6.5	47

[a] Due to small cell sizes, significance tests were not conducted on the portion of the table for applicants funded by June 1997.

(a) Unweighted cell size = 8.

(b) Unweighted cell size = 9.

(c) Unweighted cell size = 2.

Exhibit C-12

Overall satisfaction with the NIH review process by funding status and the extent to which respondent's research is currently hindered by teaching, patient care, administrative, or other work responsibilities

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
Funded by June 1997				
A great deal	16.3	10.1	15.1	131
Some	39.6	38.6	35.2	359
Only a little	30.4	34.8	20.4	283
Not at all	13.7	16.4	29.4	152
Not funded by June 1997 (χ^2 = 16.29, df = 6, p < .05)				
A great deal	34.6	31.0	23.2	212
Some	34.8	33.8	32.4	246
Only a little	18.8	23.6	23.7	165
Not at all	11.8	11.6	20.7	111

Exhibit C-13[a]

Overall satisfaction with the NIH review process by funding status and the extent to which respondent's research is currently hindered by unavailability of data or unique biological materials

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
Funded by June 1997				
A great deal	(a)	(b)	(c)	12
Some	13.0	9.3	(d)	92
Only a little	26.3	37.4	22.8	255
Not at all	59.7	51.6	71.8	510
Not funded by June 1997				
A great deal	(e)	(f)	(g)	22
Some	12.6	11.7	5.9	66
Only a little	23.7	28.9	29.5	190
Not at all	60.2	56.5	60.8	400

[a] Due to small cell sizes, significance tests were not run on the data in this table.

(a) Unweighted cell size = 4.

(b) Unweighted cell size = 4.

(c) Unweighted cell size = 1.

(d) Unweighted cell size = 5.

(e) Unweighted cell size = 5.

(f) Unweighted cell size = 7.

(g) Unweighted cell size = 8.

Exhibit C-14

Overall satisfaction with the NIH review process by funding status and the extent to which respondent's research is currently hindered by lack of colleagues at his/her institution/organization with similar research interests

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
Funded by June 1997[a]				
A great deal	5.6	4.4	(a)	57
Some	14.8	22.1	19.6	166
Only a little	25.6	32.5	(b)	251
Not at all	54.1	41.0	51.4	468
Not funded by June 1997				
A great deal	10.8	9.3	9.9	74
Some	21.3	21.0	21.5	160
Only a little	21.1	26.6	23.8	183
Not at all	46.8	43.2	44.9	338

[a] Due to small cell sizes, significance tests were not run on the portion of the table for funded by June 1997.

(a) Unweighted cell size = 8.

(b) Unweighted cell size = 9.

Exhibit C-15

Overall satisfaction with the NIH review process by funding status and the extent to which respondent's research is currently hindered by unavailability of funds for collecting pilot data

Item	Satisfied	Mixed	Dissatisfied	# of Respondents
Funded by June 1997[a]				
A great deal	10.6	26.7	37.6	178
Some	29.0	37.2	35.5	304
Only a little	30.1	19.1	14.6	234
Not at all	30.3	17.0	(a)	226
Not funded by June 1997 ($\chi^2 = 19.04$, df = 6, $p < .01$)				
A great deal	38.2	38.5	52.8	343
Some	28.8	34.1	25.1	230
Only a little	18.1	14.5	9.8	105
Not at all	14.9	12.9	12.4	103

[a] Due to small cell sizes, significance tests were not run on the portion of the table for funded by June 1997.

(a) Unweighted cell size = 7.

Exhibit C-16[a]

Recommendations for improvements in the application and review process by highest degree

Area for Improvement	MD/Other Professional Doctorate (n = 417)		PhD/MD-PhD (n = 1480)	
	Number	Percent	Number	Percent
Preliminary application process	12	2.9	52	3.5
Application process	136	32.7	522	35.2
Assignment to study section	26	6.3	60	4.0
Reviewers' expertise and understanding of proposal	81	19.6	324	21.9
Fairness of review	45	10.7	149	10.1
Reviewers' attitude toward new ideas	5	1.2	27	1.8
Usefulness of reviewers' comments	5	1.2	38	2.6
Continuity of review	7	1.8	41	2.8
Opportunity to respond to reviewers/decisions	10	2.5	63	4.2
Time between submission and funding decision	49	11.7	145	9.8
Other comments on reviewers or review process	32	7.6	126	8.5
NIH staff roles and behaviors	4	1.0	4	0.3
Other comments or suggestions on the NIH	16	3.8	53	3.6
Other comments	60	14.4	209	14.1

[a]Statistical tests to determine significance were not conducted for Exhibits C-16 through C-23.

Exhibit C-17

Recommendations for improvements in the application and review process by applicant history

Area for Improvement	First-Time Applicant (n = 331)		Previous Applicant (n = 1566)	
	Number	Percent	Number	Percent
Preliminary application process	5	1.5	59	3.8
Application process	106	31.9	553	35.3
Assignment to study section	18	5.3	68	4.4
Reviewers' expertise and understanding of proposal	52	15.8	353	22.5
Fairness of review	25	7.6	169	10.8
Reviewers' attitude toward new ideas	10	2.9	22	1.4
Usefulness of reviewers' comments	4	1.3	39	2.5
Continuity of review	7	2.2	41	2.6
Opportunity to respond to reviewers/decisions	12	3.6	61	3.9
Time between submission and funding decision	37	11.2	156	10.0
Other comments on reviewers or review process	27	8.0	131	8.4
NIH staff roles and behaviors	2	0.6	7	0.4
Other comments or suggestions on the NIH	12	3.5	57	3.6
Other comments	42	12.6	228	14.5

Exhibit C-18

Recommendations for improvements in the application and review process by Institute of FY 1994 application

Area for Improvement	NIAAA/NIDA/NIMH (n = 233)		All Other Institutes (n = 1664)	
	Number	Percent	Number	Percent
Preliminary application process	0	0	64	3.9
Application process	92	39.2	567	34.1
Assignment to study section	7	3.1	79	4.7
Reviewers' expertise and understanding of proposal	45	19.3	360	21.7
Fairness of review	24	10.4	170	10.2
Reviewers' attitude toward new ideas	3	1.2	29	1.8
Usefulness of reviewers' comments	4	1.7	40	2.4
Continuity of review	12	4.9	37	2.2
Opportunity to respond to reviewers/decisions	17	7.3	56	3.4
Time between submission and funding decision	24	10.2	170	10.2
Other comments on reviewers or review process	15	6.2	143	8.6
NIH staff roles and behaviors	1	0.3	8	0.5
Other comments or suggestions on the NIH	4	1.8	64	3.9
Other comments	38	16.4	231	13.9

Exhibit C-19

Recommendations for improvements in the application and review process by funding status

Area for Improvement	Yes, by June 1997 (n = 1023)		No, Not by June 1997 (n = 874)	
	Number	Percent	Number	Percent
Preliminary application process	30	2.9	35	4.0
Application process	413	40.4	246	28.1
Assignment to study section	51	5.0	35	4.0
Reviewers' expertise and understanding of proposal	203	19.8	203	23.2
Fairness of review	86	8.4	108	12.4
Reviewers' attitude toward new ideas	10	1.0	22	2.5
Usefulness of reviewers' comments	24	2.4	19	2.2
Continuity of review	30	2.9	19	2.2
Opportunity to respond to reviewers/decisions	45	4.4	28	3.2
Time between submission and funding decision	126	12.3	68	7.8
Other comments on reviewers or review process	88	8.6	70	8.0
NIH staff roles and behaviors	6	0.6	3	0.3
Other comments or suggestions on the NIH	33	3.2	35	4.1
Other comments	131	12.8	138	15.8

Exhibit C-20

Recommendations of first-time applicants for improvements in the application and review process by funding status

Area for Improvement	Yes, by June 1997 (n = 133)		No, not by June 1997 (n = 198)	
	Number	Percent	Number	Percent
Preliminary application process	3	2.0	2	1.2
Application process	51	38.6	54	27.4
Assignment to study section	10	7.4	8	4.0
Reviewers' expertise and understanding of proposal	17	12.9	35	17.8
Fairness of review	8	5.9	17	8.7
Reviewers' attitude toward new ideas	4	3.1	6	2.8
Usefulness of reviewers' comments	2	1.5	2	1.1
Continuity of review	3	2.2	4	2.2
Opportunity to respond to reviewers/decisions	4	2.9	8	4.1
Time between submission and funding decision	23	17.5	14	7.0
Other comments on reviewers or review process	10	7.8	16	8.2
NIH staff roles and behaviors	0	0.0	1	0.7
Other comments or suggestions on the NIH	3	2.2	9	4.5
Other comments	16	12.2	26	12.9

Exhibit C-21

Recommendations of previous applicants for improvements in application and review process by funding status

Area for Improvement	Yes, by June 1997 (n = 890)		No, not by June 1997 (n = 676)	
	Number	Percent	Number	Percent
Preliminary application process	27	3.0	32	4.8
Application process	362	40.7	191	28.3
Assignment to study section	41	4.6	27	4.0
Reviewers' expertise and understanding of proposal	186	20.8	168	24.8
Fairness of review	78	8.8	91	13.4
Reviewers' attitude toward new ideas	6	0.7	16	2.4
Usefulness of reviewers' comments	22	2.5	17	2.5
Continuity of review	27	3.0	15	2.2
Opportunity to respond to reviewers/decisions	41	4.6	20	3.0
Time between submission and funding decision	102	11.5	54	8.0
Other comments on reviewers or review process	77	8.7	54	8.0
NIH staff roles and behaviors	5	0.6	1	0.2
Other comments or suggestions on the NIH	30	3.4	27	3.9
Other comments	115	12.9	113	16.7

Exhibit C-22

Recommendations for improvements in application and review process by funding source

Area for Improvement	Received Funds from NIH (n = 895)		Received Funds from Other Source (n = 111)		Received No Support (n = 190)	
	Number	Percent	Number	Percent	Number	Percent
Preliminary application process	26	2.9	5	4.4	9	5.0
Application process	339	37.8	33	29.9	73	38.6
Assignment to study section	43	4.9	6	5.4	6	3.0
Reviewers' expertise and understanding of proposal	158	17.6	34	30.8	46	24.0
Fairness of review	70	7.8	15	13.8	28	14.8
Reviewers' attitude toward new ideas	11	1.2	2	1.9	2	1.0
Usefulness of reviewers' comments	22	2.4	1	1.3	7	3.4
Continuity of review	27	3.0	3	2.8	6	3.4
Opportunity to respond to reviewers/decisions	42	4.7	3	2.4	7	3.8
Time between submission and funding decision	110	12.3	7	6.6	19	10.2
Other comments on reviewers or review process	88	9.8	10	8.6	18	9.3
NIH staff roles and behaviors	3	0.3	0	0.0	1	0.4
Other comments or suggestions on the NIH	28	3.1	6	5.6	10	5.2
Other comments	132	14.7	14	13.0	25	13.1

Exhibit C-23

Recommendations for improvements in application and review process by extent of overall satisfaction with the NIH application and review process

Area for Improvement	Satisfied		Mixed		Dissatisfied	
	Number	Percent	Number	Percent	Number	Percent
Preliminary application process	25	1.4	23	1.2	12	0.7
Application process	274	15.0	209	11.4	169	9.3
Assignment to study section	33	1.8	25	1.4	28	1.5
Reviewers' expertise and understanding of proposal	111	6.1	158	8.6	132	7.2
Fairness of review	41	2.2	66	3.6	85	4.6
Reviewers' attitude toward new ideas	10	0.6	4	0.2	17	0.9
Usefulness of reviewers' comments	18	1.0	13	0.7	10	0.6
Continuity of review	17	0.9	15	0.8	12	0.6
Opportunity to respond to reviewers/decisions	31	1.7	25	1.4	17	0.9
Time between submission and funding decision	88	4.8	78	4.3	27	1.5
Other comments on reviewers or review process	71	3.9	59	3.2	25	1.3
NIH staff roles and behaviors	3	0.2	3	0.2	2	0.1
Other comments or suggestions on the NIH	34	1.8	10	0.6	24	1.3
Other comments	75	4.1	106	5.8	74	4.1

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