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**Process Analysis on the
Operation of the NIH
Undergraduate
Scholarship Program**

Final Report

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EXECUTIVE SUMMARY

BACKGROUND

The Undergraduate Scholarship Program (UGSP) was established to interest and support students from disadvantaged backgrounds in pursuing careers in biomedical and other health-related research at the National Institutes of Health (NIH). The program pays up to \$20,000 per academic year toward tuition and other expenses associated with college attendance. In exchange for financial support, scholarship recipients (known as UGSP “Scholars”) incur two service obligations. First, in the summer after each year of funding, they must work for 10 weeks in a research laboratory at the NIH and participate in a variety of program activities. Second, for each year in the program, Scholars must work for one full year in an NIH lab (known as “payback”), with the timing of this obligation somewhat flexible. In addition, Scholars must designate a faculty member from their colleges to serve as an advisor during the academic year.

In addition to being economically disadvantaged, applicants must be U.S. citizens or qualified to work for the federal government, enrolled full time in college, and maintain a 3.5 grade point average. They also must demonstrate a keen interest in biomedical research. The program is highly competitive, with only about 15 new Scholars named each year. The first scholarships were awarded for the 1996-97 academic year; through 2003-04, scholarships have been awarded to a total of 103 students. The awards are renewable for up to four years.

This report presents the results of a study to assess whether the UGSP program is operating as intended. Focusing on the major components of the program—application and selection, academic advisement during the school year, the summer research experience, and employment at NIH after graduation—we describe the official expectations for how these components operate and summarize the experiences and perspectives of key stakeholders. We draw on several information sources: interviews with program officials, program administrative records, the UGSP website, interviews with selected academic advisors and NIH mentors, and four focus groups comprised of UGSP Scholars.

KEY FINDINGS

Application and Selection

A majority of the Scholars we spoke with were primarily attracted to the UGSP because of the opportunity to work at the NIH. Only a few reported that the financial value of the scholarship had been the main reason they were initially attracted to the program. Many focused on the potential experiential benefits because they had other means of paying for their schooling; this award simply replaced those other resources. Some who did not perceive the UGSP as providing them much financial benefit were a bit bothered by having to spend the same amount of time in payback as those who received much more money from the program.

Academic advisors thought very highly of their Scholars, describing them as having superior knowledge and research skills compared with other students at the same point in their studies. NIH mentors were generally complimentary towards the Scholars they supervised in the summer, though slightly less so than the academic advisors. A key factor seemed to be that some of them had been exposed to several other very highly qualified students over the years, which is not surprising, given that the NIH attracts top candidates from all around the country. Several of the mentors indicated that if the Scholars had not been in the UGSP, they might not have agreed to take them into their labs for the summer. The mentors supported the goal of the program and being affiliated with the UGSP helped Scholars to stand out from the competition.

Academic-Year Advising

Although program materials describe appointing an academic advisor as a responsibility of the Scholar's undergraduate institution, Scholars themselves took the initiative to find an advisor after being accepted into the program. Most of the faculty members had not heard of the program until they were asked to serve as academic advisors by one of the Scholars. In most cases, the Scholars chose faculty members with whom they already had fairly close mentoring-like relationships, although there were a few exceptions.

Both the academic advisors and Scholars described a wide range of relationships in terms of how often they interacted and what they discussed. Some Scholars worked in their advisors' labs and saw them daily; others had informal relationships focused around personal, academic, and career advice; some reported rarely talking with one another.

Requiring Scholars to name an academic advisor generally did not foster closer relationships between the students and faculty members we interviewed. Most Scholar-advisor relationships continued on as they had before the faculty members took on these formal roles. Just one advisor and one Scholar said their relationships had changed substantially for the better; conversely, one academic advisor and two Scholars described program participation as having had a negative effect on their relationships, reducing the frequency with which they saw one another. But while Scholars and advisors did not necessarily develop closer relationships than they would have in the absence of the program,

some of them still felt that this required component of the UGSP could prove helpful to some participants and to the program more generally.

Summer Session

Overall, the process for finding a mentor worked well for most of the Scholars. Some were impressed with the efforts of program officials to help them find suitable summer lab assignments. One criticism was the difficulty of identifying a good lab assignment five months in advance, given the uncertainties that may surround institutional scientific research, such as the specific projects Scholars would be able to work on. Two of the mentors suggested a few changes to improve the mentor-match process, including allowing more than 15 minutes for mentors' presentations, enabling Scholars to tour several labs before they have to decide where they would like an interview, providing more information about the Scholars, and allowing more time for mentors to get to know them.

The mentors said they understood that the Scholars needed to work on a research project, and a few specifically mentioned research that would lead to a poster presentation toward the end of the summer. They also mentioned the goals of developing Scholars' research skills and showing them "how real science is done." However, mentors explained that they typically had too many other responsibilities to spend much time working directly with Scholars; that would be left to other lab staff. Their encounters with Scholars ranged from brief, informal discussions about the ongoing research on a daily basis to formal lab meetings held once a week. Virtually all of the mentors had discussed education and career options with their Scholars, typically in response to Scholars' questions. Although about half of the mentors said that hosting a UGSP Scholar in their labs for the summer posed no particular challenges, others identified a few challenges, including identifying the right kind of projects for Scholars to work on.

Generally, most Scholars were happy with their summer lab experiences. Some offered highly positive assessments, saying that the experiences were outstanding. Others, though, had not been fully challenged in their research assignments. In some cases, this had to do with their own choices, such as selecting a lab that would not require them to master new skills. In other cases, however, the issue seemed to be low expectations by supervisory staff about what the Scholars could accomplish. Scholars' relations with their mentors varied considerably, from close to distant. Their level of satisfaction with their situations depended in part on their initial expectations. One Scholar assumed, going in, that she would not have much direct interaction with her mentor and was pleasantly surprised to have fairly frequent contact. Another Scholar who had expected to have good access to her mentor was very disappointed to end up having little contact with him, and instead worked with someone who had not gone to graduate school and who she therefore felt could not be of much help regarding her educational interests.

Payback

Scholars' participation in the UGSP was a very important factor in mentors' decisions to take them into their labs for one or more years. Some mentors would not have been able to

do so if top officials in their ICs had not “loaned” them full-time equivalent (FTE) positions in support of the UGSP and its goals. Most of the mentors were satisfied with the abilities of the payback Scholars they worked with, commonly rating them as on a par with other full-time employees who were at the same point on their education and career paths. Two mentors felt that they did not end up with good matches: one of the Scholars was unable to conduct the research that needed to be done; the other, whose career interests had moved away from scientific research, reportedly showed up inconsistently and did very little work.

Mentors described widely varying goals for payback Scholars—in addition to ensuring they had interesting research to conduct—including having them more work more independently, developing a long-term project, building their technical and research skills, teaching them more about science and academic medicine, and adding to their credentials through publications and presentations. Nonetheless, they generally expected that the Scholars would work under the direct supervision of another senior staff member in the lab. Overall, the frequency and pattern of mentors’ contacts with Scholars in payback was similar to the nature of their interactions during summer. Several mentors saw no particular challenges associated with having a UGSP Scholar in their lab for a full year. Challenges identified by other mentors included dealing with Scholars’ absences when they went on interviews for medical or graduate school, and providing work at the appropriate level to keep Scholars challenged and engaged.

Scholars cited diverse reasons for their decisions to do their payback right after college or defer it until later. Those who had done it right away mentioned wanting to take a break before graduate or medical school, make some money, determine their interests with regard to choosing a postgraduate program, and gain experience that would increase chances of being accepted into a particular postgraduate program. Those who had decided to defer payback assumed or hoped that their interests and abilities would allow them to find a suitable lab assignment at the NIH relatively easily after completing their educations. Two Scholars who had deferred their work commitments found that their career interests had changed in the interim and they saw the prospect or the experience of returning to the NIH less enjoyable than it might have been if they had completed their service right after college.

For most of the Scholars who had started or completed their payback, the experience had apparently gone well. The experience was somewhat negative for a few of them, however. One described not being sufficiently challenged; another’s “bad lab experience” made him not enjoy research in the field he had chosen.

Most of those who were still in college, or had just graduated but were deferring their obligation, did not have a clear sense of where in the NIH they might work during payback. This is unsurprising, given that payback was several years in the future for many of them. In many cases, though, they were optimistic about the experience, seeing it as the “next step” on their career paths, even if they did not know where those paths would lead. Some had clear ideas about what they wanted to learn and accomplish, sometimes contrasting their idealized future experience with past UGSP summer sessions. They were expecting, for example, to have more independence, do more writing, and be seen more as a colleague. Some Scholars saw their happiness during payback and its subsequent value to them as

depending heavily on their eventual choice of a mentor. They hoped to establish close relationships with someone who would value and trust them, and who would spend time trying to help them in various ways.

Additional Perspectives

Some findings did not pertain to just one of the program components discussed above, but to the broader functioning and purpose of the program.

Program Communications and Scholar Feedback. Although they may not have always had all the information they wanted at a particular point in time, such as the wages they would earn during summer, some Scholars mentioned that their contact with program staff had been very good—better than with most other programs or offices that undergraduates typically encounter. Scholars also seemed pleased with their opportunities to provide both informal and formal feedback about the program, particularly concerning the summer session. They felt that the staff members were interested in hearing their comments and concerns, and that the director was very approachable. In addition, they viewed officials as responsive to their feedback and willing to make adjustments.

Future Employment at the NIH. While none of the Scholars said they definitely would pursue permanent employment at the NIH, a few were enthusiastic about the possibility. They were attracted by factors such as the opportunity to conduct research without having to secure grant funding, plentiful learning opportunities, the location, and the many collaborations that take place. However, a few had virtually ruled out eventual employment at the NIH, all citing its location as the major factor. Several other Scholars were at least open to the possibility of working at the NIH, but felt they would need to settle on a particular type of research and a particular field before they could contemplate any particular employer as they had many years of education and training remaining.

Some Scholars who were racial/ethnic minorities and/or women had mixed views on how comfortable or welcoming a place the NIH was to work. They generally felt the NIH was fairly comfortable—none said it was uncomfortable or unwelcoming—but they noted some unevenness in minority representation and felt improvements were desirable, such as more minorities in higher positions.

Scholars' Overall Assessments of their UGSP Experiences. Asked to give their overall views of the program, several Scholars offered very strong endorsements. They greatly appreciated their experiences at the NIH and cited numerous benefits they had derived from their participation, including diverse opportunities they would not otherwise have had, better peer networks, exposure to top scientists, increased self-confidence, an edge in future academic work, and personal and professional growth. A few noted that their comments pointing out problems and negative experiences should be considered in light of their strong overall appreciation of the program; they simply wanted to help make the program even better.

CONCLUSION

This report should help NIH officials consider the future direction of the UGSP. Stakeholders' comments provide a broad and deep perspective on the program, and may foster new thinking—or confirm past thinking—about how best to ensure that the program is operating as intended and is on the path to achieving its objective of drawing economically disadvantaged students into biomedical research careers, preferably at the NIH.

Our overall assessment is that the UGSP appears to be operating as intended: It seems to be attracting bright applicants interested in biomedical research; it creates the opportunity for Scholars to develop a helpful relationship with a faculty member at their college; and it gives some of them research and developmental opportunities they might not otherwise receive. In addition, the program appears to be operating smoothly, without any noteworthy administrative problems. The Scholars generally felt positive about the program and their experiences in it. While they and other stakeholders did raise a variety of concerns or complaints, these were outweighed by the favorable assessments. They meant their criticisms to be constructive and to help improve a program they already viewed positively, overall.

On the basis of all the information we collected and analyzed, we present options below for dealing with five of the issues that emerged from the study:

- ***Increase the priority placed on awarding initial scholarships to college juniors or sophomores.*** This could lead to personal benefits for some Scholars, including stronger applications to postgraduate programs. It could also increase the length of their involvement in the program, which in turn could help interest more of their fellow students in the program, and increase both their future interest in the NIH and the chances that their academic advisors would attend a summer session.
- ***Strengthen connections to academic advisors.*** Greater efforts to get advisors to visit during the summer and to build their knowledge of the program might benefit the program in various ways, especially in making advisors better sources for referrals of future applicants.
- ***Continue efforts to see that Scholars have positive experiences working in NIH labs.*** Communicating early and effectively with both Scholars and lab staff about finding good matches, establishing realistic expectations, and responding to problems, should help ensure that Scholars enjoy their research tasks and are not disappointed by their relationships with their mentors.
- ***Try to change Scholars' perceptions of the full-year service commitment.*** Unequal scholarships contribute to some Scholars seeing this program component as unfair or burdensome. Rather than using words such as “payback” and “obligation” to describe the year(s) they must spend working at the NIH, portraying it more as a special opportunity and a program benefit might help shape different perceptions. Another option would be to award

equal-sized scholarships and allow Scholars who do not need the full amount for undergraduate studies to reserve the funds for graduate or medical school, although this might require a legislative change.

- ***Create more interest in deferring the full-year service commitment.*** To make deferral of payback more appealing to current and future Scholars, officials could present positive testimonials from Scholars who deferred their service and viewed the experience as positive, as well as from NIH mentors who prefer working with individuals who have completed their postgraduate degrees. Additionally, officials could explore financial incentives for Scholars to defer their full-year service commitments, such as signing bonuses or loan repayment, although such features would likely require legislative changes.

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CHAPTER I

INTRODUCTION

BACKGROUND ON THE PROGRAM

The Undergraduate Scholarship Program (UGSP) was created in 1993 by Public Law 103-43 to interest and support highly talented students from disadvantaged backgrounds in pursuing careers in biomedical and other health-related research at the National Institutes of Health (NIH). Its creation was one of several steps taken by the NIH during the past decade to increase the diversity of its own intramural research staff and of the biomedical research field more generally. The program is administered by the NIH's Office of Loan Repayment and Scholarship (OLRS).

The UGSP promotes the pursuit of biomedical research careers by paying up to \$20,000 per academic year toward tuition, other education expenses (for example, books, laboratory fees, and graduation fees), and reasonable living expenses. In exchange for this financial support, scholarship recipients, known as UGSP Scholars, incur two service obligations:

- 1. *Summer Research Experience.*** After each academic year of funding, scholarship recipients must work for 10 weeks during the summer as paid employees in a research laboratory at the NIH campus in Bethesda, Maryland. Each Scholar is matched with one or more NIH staff who serve as mentors during the 10-week period. In addition to conducting research, the Scholars are required to attend a variety of formal seminars and participate in other program activities.
- 2. *Employment at NIH After Graduation.*** After receiving their bachelor's degrees, Scholars must serve as full-time, paid employees in an NIH research laboratory, working one year (52 weeks) for each academic year in which they received funding from the UGSP. This service obligation, known as "payback" can be deferred while students pursue graduate or medical studies that will lead to careers in biomedical research.

In addition to these service obligations, UGSP Scholars are required to have a faculty member from their undergraduate institution serve as an advisor during the academic year to foster their educational and career development.

To be eligible for the scholarship, an applicant must, at a minimum:

- Be a U.S. citizen, national, or qualified non-citizen eligible to work in the United States
- Be enrolled or accepted for enrollment as a full-time student at an accredited undergraduate institution for the upcoming academic year
- Have a college grade point average (GPA) of at least 3.5 (on a 4.0 scale) or be in the top 5 percent of his or her high school class
- Come from a disadvantaged family and have “exceptional financial need,” defined as low income according to guidelines published each year by the U.S. Department of Health and Human Services (Table I.1 shows the income limits for calendar year 2002, the most recent figures available)
- Be eligible for federal employment, free of federal judgment liens and delinquent federal loans, and have no conflicting service obligations

Table I.1: Low-Income Thresholds Used to Determine Exceptional Financial Need for the UGSP and Other Health Profession Programs

Size of Parents' Family (Includes only dependents listed on Federal income tax forms)	Maximum Income (Gross income for calendar year 2002, rounded to nearest \$10)
1	\$17,960
2	\$24,240
3	\$30,520
4	\$36,800
5	\$43,080
6	\$49,360
7	\$55,640
8	\$61,920

Source: Website for the UGSP (<http://ugsp.info.nih.gov>).

Beyond meeting these basic eligibility requirements, it is vital that applicants demonstrate a serious interest in pursuing a career in biomedical or behavioral and social science health-related research. Past coursework is an important indicator of their interest in scientific research. They also must demonstrate their interest in science through multiple short essays on the application form. In addition, the form asks them to list and explain any special recognitions, scholastic awards and honors, and other scholarships they have received, and to describe their initiative, work habits, leadership skills, creativity in problem solving, and ability to work as a member of a team. Finally, all applicants must arrange for

written recommendations from three individuals who have direct knowledge of their research and academic qualities.

Applications are due by the end of February and award decisions are made by the end of June for the following academic year. OLRs staff review complete applications submitted by eligible students and select a set of about 40 semifinalists based on overall merit, particularly focusing on their experiences and goals relating to scientific research. A different review panel, composed of NIH and outside scientists, reviews the semifinalists' applications and selects and interviews a set of finalists. After considering not only the depth of the finalists' understanding of and interest in science, but also how they present themselves, the panel chooses the scholarship recipients.

Students may receive a maximum of four years of financial support from the UGSP. The eligibility standards for Scholars who wish to renew their scholarships remain high, although the application process is simpler than the process for an initial award. To be eligible for a scholarship extension, students must: continue to study full time at an approved institution; have a cumulative GPA of at least 3.5, or be ranked in the top 5 percent of their class; demonstrate a continued commitment to a biomedical research career through a written statement assessing their progress in the prior academic year and identifying goals for next academic year; and complete their prior summer laboratory experience at NIH and receive a favorable assessment on their work from their NIH research supervisor. Renewal applicants do not have to go through a panel interview like new awardees, but are interviewed by the director when their applications are ready.

The first scholarships were awarded for the 1996-97 academic year; through 2003-04, scholarships have been awarded to 103 students from 69 colleges and universities. Among them, they have received a total of 152 years of support. Scholars have come from every region of the country, and the large majority have been racial/ethnic minorities. A detailed profile of Scholars is presented in Chapter II.

BACKGROUND ON THE EVALUATION

The NIH has been interested in an evaluation of the UGSP for several years. When it established the program, the OLRs asked Mathematica Policy Research (MPR) to assess the applicant selection process and to make recommendations for designing an evaluation of the program's implementation and outcomes. MPR recommended waiting several years before initiating an evaluation, so that the program could mature and several cohorts of Scholars could go through the program and advance in their careers to a point where it was reasonable to assess whether they were achieving the program's desired outcomes. Later, MPR prepared a report discussing issues and options for attracting high-quality, eligible candidates to the UGSP¹ and developed a design for an evaluation of the program. In March 2003 the NIH issued a task order request to conduct an evaluation, following MPR's design, and in

¹Justin Humphrey and Steven Glazerman, "The NIH Undergraduate Scholarship Program: Issues and Options for Recruiting and Outreach." Washington, DC: Mathematica Policy Research, Inc., December 2001.

June 2003 awarded the project to MPR and its subcontractor, Decision Information Resources.

The evaluation has two major components: a process study and an outcomes study. The overarching objective of the process study—and this report—is to assess whether the UGSP is operating according to plan. However, because the main components of the UGSP—having an academic advisor at college, participating in a summer research program at the NIH, and working at the NIH after college graduation—are mandatory for the participants, our objective was not to document the extent to which these activities take place, as is common with process studies. Rather, we set out to describe *how* these activities take place and to convey diverse stakeholders' perspectives on their experiences in the program.

The data sources for this process study include the following:

- ***Interviews with Program Officials.*** In December 2003, we separately interviewed the director of the OLRs and the director of the UGSP, to gain an historical perspective on the program and a deeper understanding of how it is intended to operate today.
- ***Review of Program Documents.*** We consulted the program's website for many details on program rules and operations (<http://ugsp.info.nih.gov>). We also reviewed an NIH report summarizing a December 1995 meeting conducted to help design the program.
- ***Administrative Data.*** The OLRs provided data on all UGSP Scholars funded through the 2003-04 academic year, including background characteristics, the years in which they were funded, and names and contact information for senior NIH staff and university-based academic advisors who had worked with the Scholars.
- ***Focus Groups with UGSP Scholars.*** We conducted four focus groups that included 20 current or past scholarship recipients. The sessions were held in locations where small groups of Scholars could be easily convened with little or no travel on their part. The first session, in spring 2004, took place in Boston. The remaining three sessions were held in summer 2004 at the NIH campus in Bethesda. Concentrating mainly on Scholars working at the NIH in summer 2004 provided us with a perspective on how the program is operating now and in recent years, as opposed to its earlier years of existence. Lasting 75-90 minutes, the focus groups gave participants a chance to share their experiences and express their opinions on many issues related to the program. While not statistically representative of all UGSP Scholars, the focus group participants broadly reflected the diversity of the full group on characteristics such as demographics, year of initial award, home region and region in which they attend(ed) undergraduate school, status in the program (still in school,

graduated, in payback), and years of funding. (A detailed profile of the focus group participants is presented in Chapter II.)

- ***Interviews with NIH Mentors.*** In spring 2004, we conducted brief telephone interviews with 12 NIH staff members who had served as mentors during both summer and payback since 2000. This focus was intended to allow for efficient collection of data on both major program components and to increase accuracy of recall. (The individuals were not expected to be representative of all NIH staff who have served as mentors to UGSP Scholars.) Mentors who had supervised more than one Scholar for a summer or full year during the timeframe of interest were asked to focus on the Scholar they had supervised most recently.
- ***Interviews with Academic Advisors.*** In spring 2004, we conducted brief telephone interviews with a random sample of nine college faculty members who had served as academic advisors to UGSP Scholars since 2001. The focus on advisors to recent Scholars was intended to increase accuracy of recall. This small group might not have been representative of all past and current academic advisors, but was of sufficient size to elicit a diverse range of perspectives on the UGSP.²

The outcomes study addresses the question of whether the UGSP appears to be headed toward achieving its long-term objective of attracting more students from disadvantaged backgrounds to pursue careers in biomedical research, particularly at the NIH. Because the training pipeline for biomedical researchers takes many years to complete, and because the UGSP is still a relatively new program, the outcomes study will assess the extent to which UGSP Scholars are “on track,” educationally and in their careers, to eventually become tenured research scientists at the NIH. The results of the outcomes study will be presented in a separate report.

OVERVIEW OF THIS REPORT

This report presents the findings from the process study, addressing the research questions outlined above pertaining to program operations. The next four chapters focus on the four basic stages or components of the UGSP: Chapter II addresses the application and selection process; Chapter III describes mentoring during the academic year; Chapter IV discusses Scholars’ summer laboratory experiences at the NIH; and Chapter V addresses employment at the NIH after graduation. Each of these chapters begins with background information on the program component drawn from program documents, administrative data, and interviews with program officials, and then summarizes the experiences and perspectives of key stakeholders in these stages. Chapter VI summarizes Scholars’

²Readers should bear in mind that much of the information we collected through interviews and focus groups is inherently subjective, and that respondents’ recollections may not always be totally accurate. We did not attempt to verify respondents’ factual statements, nor did we challenge their opinions.

comments on some aspects of the program that do not pertain exclusively to any one program component addressed in the preceding chapters, as well as Scholars', advisors', and mentors', overall assessments of the program. Throughout the five main substantive chapters, we use direct quotations extensively, believing that stakeholders' own words are often the best way to illustrate and expand upon the main point being made. Finally, Chapter VII presents our concluding observations, highlighting important findings and potential implications for the UGSP.

CHAPTER II

THE USGP APPLICATION AND SELECTION PROCESS

BACKGROUND ON APPLICATION AND SELECTION

Some details relating to the application and selection process, such as program eligibility guidelines, were described in the preceding chapter. Here we briefly describe the target population for the USGP and the application and selection process for new applicants and those seeking an additional year of funding. We describe how things have changed over time and how they work now. We also present information on the characteristics of all Scholars as well as those who participated in our focus groups.

Target Population

In its first several years of operation, students who were not low-income according to the official guidelines could still apply for the scholarship if they could demonstrate, through a personal essay, that they had overcome some other barrier(s) in life that might have made it difficult for them to obtain the knowledge, skills, and abilities needed to successfully pursue an undergraduate degree. Prior to the application cycle for 2003-04 awards, however, officials at the U.S. Department of Health and Human Services decided that program eligibility should be restricted to low-income students. The USGP director reported that roughly one-third of scholarship recipients to that point had qualified on the basis of overcoming personal barriers, not on the basis of exceptional financial need. He said the rule change has made it somewhat more difficult to find a good-sized pool of highly qualified applicants.

Initial Application Process

The review and selection process for initial applicants consists of three main stages or activities. First, OLRs staff weed out any applications that are incomplete, as well as any applicants who do not meet the eligibility criteria. Second, a group of three OLRs staff members reviews the remaining applications, considering applicants' qualifications, experiences, and goals. A strong, diverse group of 30 to 45 applications are selected as semifinalists for review by the award committee. The goal is to provide the committee at least twice as many applications as the anticipated number of awards; on average, 15 new

scholarships are awarded each year.³ Third, committee members closely review the semifinalists' applications and give them numeric scores on several dimensions (academic performance, interest in science, communication skills, leadership skills, and general potential), producing a ranked list. Fourth, applicants with the top overall scores are named as finalists and are invited to the NIH for small group interviews.⁴ At this point, however, the rankings are set aside and all finalists are considered equally qualified for the award; performance in the interview is the basis on which the committee decides which applicants should be offered the scholarship.

The review committee consists of seven members: three are academics from outside of the NIH, three are senior NIH researchers, including the director of the UGSP, and the final member is the director of the OLRs. The group is diverse in terms of fields of interest and personal characteristics, and several members have served on the committee for six or more years. The director of the OLRs sees this diversity and experience as helpful for evaluating applicants.

The UGSP website describes a four-tiered priority system for making final award decisions, in which the first priority is to fund college juniors or seniors who have completed four core courses in science (biology, chemistry, physics, and calculus); the second priority is students who have completed four core science courses but are not juniors or seniors; the third priority is freshmen or sophomores, regardless of the number of core science courses completed; and the fourth priority is high school seniors accepted for full-time college enrollment in the fall. But OLRs officials explained that these are flexible guidelines and do not strictly determine the review committee's ranking of applicants. Other factors, such as academic performance, are considered. For example, a sophomore with a stellar record could be ranked higher than a junior with a borderline record. Also, according to the OLRs director, the review committee feels that restricting awards to juniors and seniors would negate the potential benefit of having awardees exposed to the NIH for multiple years.

Contingent Awards for Rising Freshmen

During the program's first few years of operation, students were eligible for scholarships during their freshman year of college. But program officials learned that such students sometimes had difficulty with the transition to college, and those who struggled academically as freshmen were harder to place in summer internships at the NIH. Therefore, the OLRs changed its policy concerning high school applicants. Now, although high school seniors may apply to the UGSP for their first year of college, they do not receive funding as freshmen and are accepted into the program on a contingent basis. If contingent awardees achieve a 3.5 GPA as freshmen, they may participate in the summer session at the

³Program officials consider this number to represent a "critical mass," large enough to build program identity and develop cohesiveness among the participants, but not so large that the experience becomes less personal or special.

⁴During the first few years of the program, interviews were not conducted as part of the application and selection process; review panelists considered only written application materials.

end of that year and will receive the scholarship in their sophomore year. Very few students have been accepted into the UGSP on a contingent basis and some who were accepted did not meet the standard for funding as sophomores.⁵

Extension Application Process

Scholarship recipients who have at least one year of undergraduate study remaining and who maintain good standing in the program may apply for a one-year extension of their award. Good standing is defined as performing satisfactorily in the summer laboratory assignment (as attested to by their NIH research supervisor), and maintaining a 3.5 GPA. Exceptions can be granted for recipients whose GPA has slipped below 3.5, but these are rare. In addition, extension applicants must get a written recommendation from their university-based academic advisors, describing (1) the benefits the Scholar has received from participating in the program, and (2) the Scholar's development as a biomedical researcher over the past year. The NIH is pleased to continue supporting highly qualified participants. Applicants in good standing are routinely granted extensions; they do not compete with one another for limited resources, nor are they re-evaluated anew in comparison with the newest pool of initial applicants.

Through the 2003 cohort, of the 75 students who first received the award in their freshman, sophomore, or junior year of college, and thus had the potential to apply for an extension, 53 percent received a second year of funding. OLRs administrative data do not indicate whether participants actually applied for extensions, so we cannot estimate an extension application rate, or the success rate of extension applicants. Although exact figures are unavailable, it is clear from our interviews that not all participants who could apply for an extension do so. When extension applicants are turned down, the program director explained, it is virtually always because of their GPA, not their summer lab performance at the NIH. He also talks with participants who are struggling to maintain a 3.5 GPA, essentially warning them that if they were to apply for an extension, their chances of receiving another scholarship would not be good. This enables them to pursue other college funding options as early as possible.

Scholar Characteristics

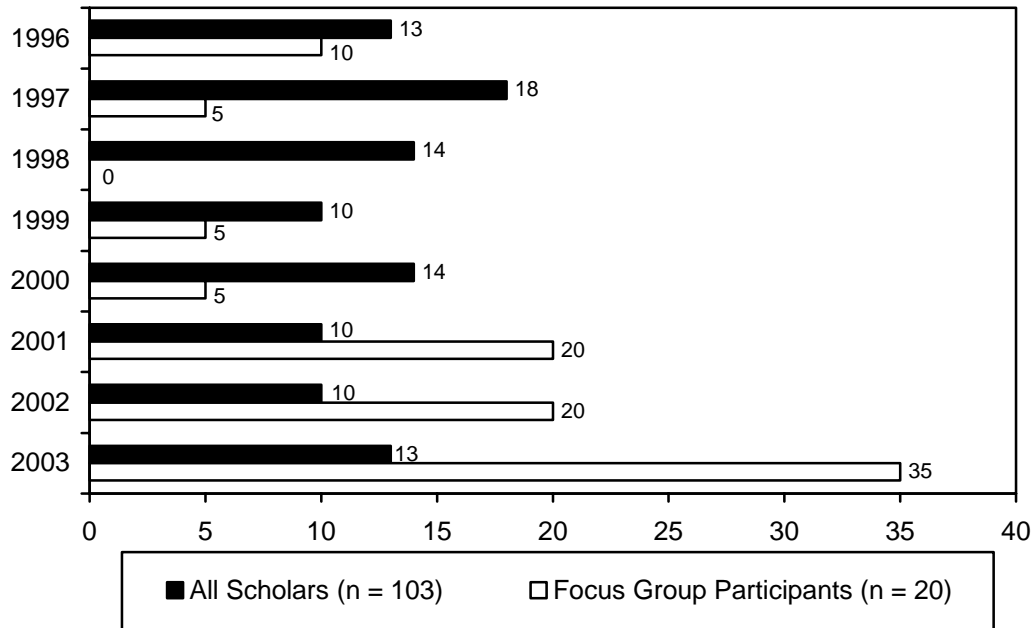
Students selected for the UGSP have been diverse in certain background characteristics (see Figures II.1 to II.7). About 85 percent of Scholars have been racial/ethnic minorities, with blacks and Hispanics each accounting for one-third of the total. Almost one-third have come from states in the Northeast, while the South Central and the Southwest regions have each accounted for about one-fifth of the Scholars. Scholars have also varied in terms of their levels in college when initially funded (juniors accounted for a plurality, at 38 percent, while 16 percent were sophomores) and in the number of years for which they received

⁵College-level applicants are never admitted to the program on a contingent basis; they either win the scholarship or they do not; interested non-recipients must reapply and re compete for the award the next year.

funding (about 60 percent were in the program for just one year, and fewer than 10 percent have had three years of funding).

Finally, Scholars have come from a wide range of postsecondary institutions. Many have attended highly competitive colleges and universities, considered among the most prestigious in the nation; for example, 15 were from Harvard, Yale, or Stanford Universities. Participants have also come from well-known Historically Black Colleges and Universities, including Hampton University, Howard University, and Spelman College; other highly regarded liberal arts colleges such as Creighton University, Oberlin College, and Smith College; and a diverse array of public institutions, including the University of California at Los Angeles, Montana State University, and the University of Puerto Rico at Mayaguez. A full list of the institutions attended by UGSP Scholars is provided in Appendix A.

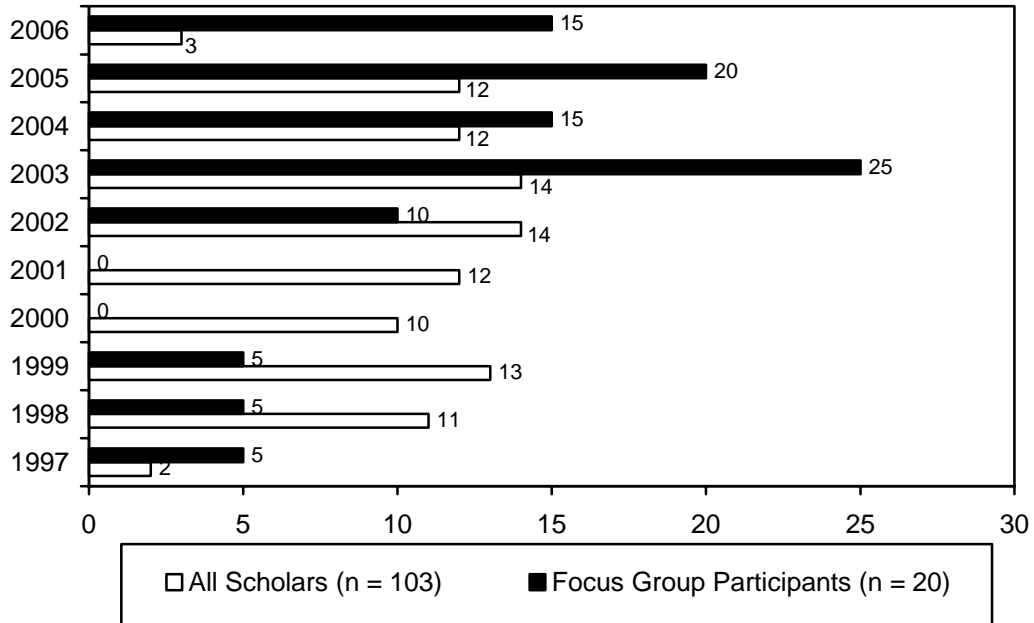
Figure II.1: Cohort – Initial Year of Funding (in percent)



Source: UGSP administrative data.

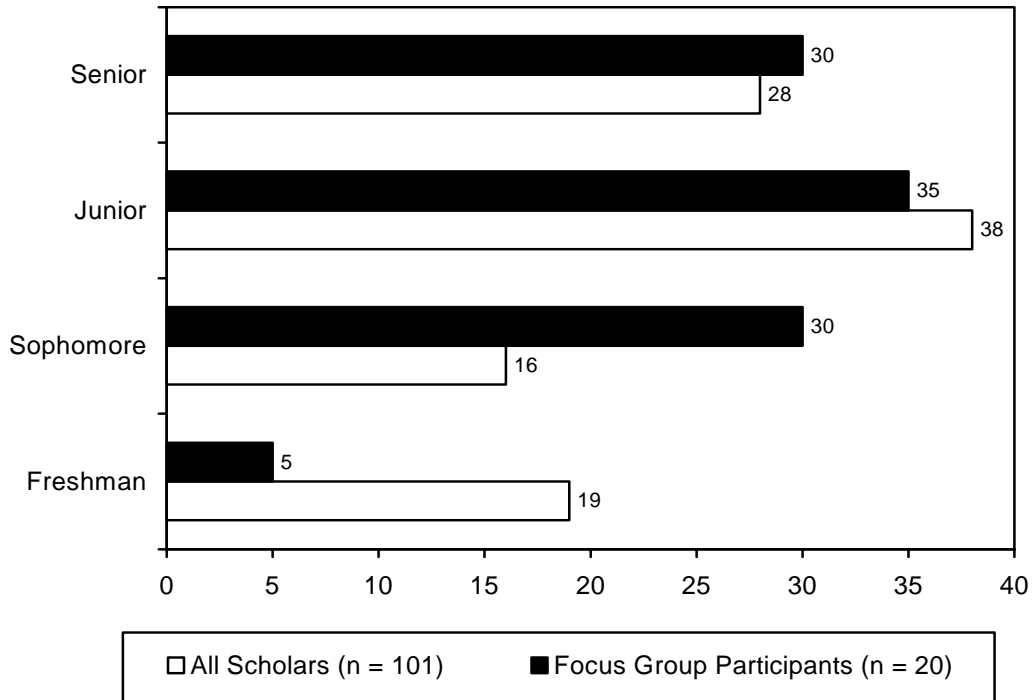
Note: Percentages for All Scholars may not total 100 due to rounding.

Figure II.2: Year of Undergraduate Graduation – Actual or Expected (in percent)



Source: UGSP administrative data.

Note: Percentages for All Scholars may not total 100 due to rounding.

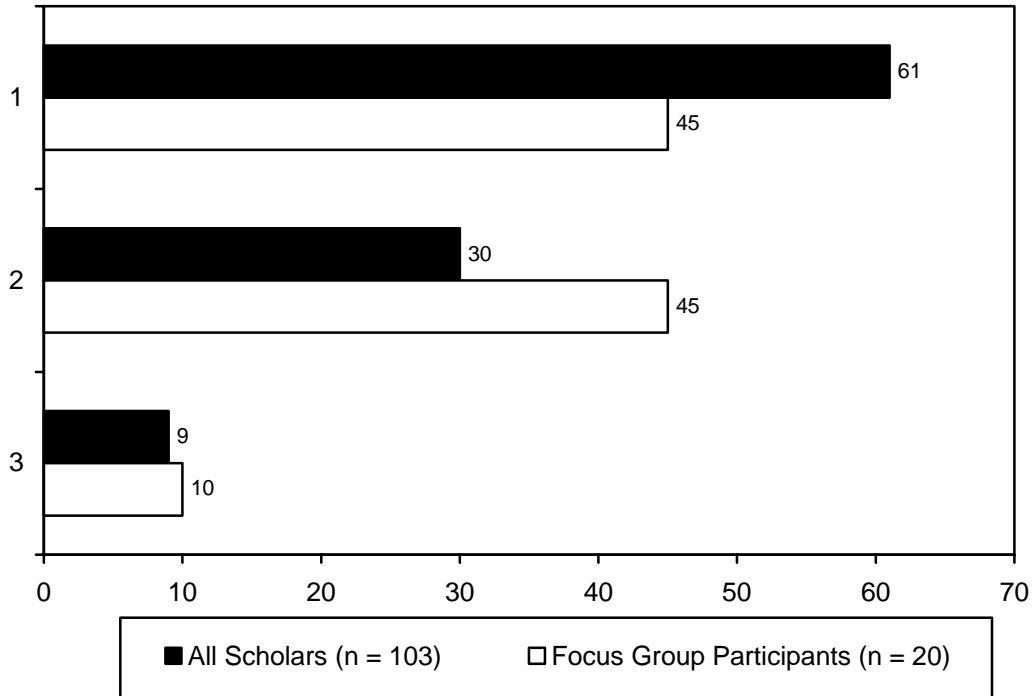
Figure II.3: Undergraduate Level when First Funded (in percent)

Source: UGSP administrative data.

Notes: Percentages for All Scholars may not total 100 due to rounding.

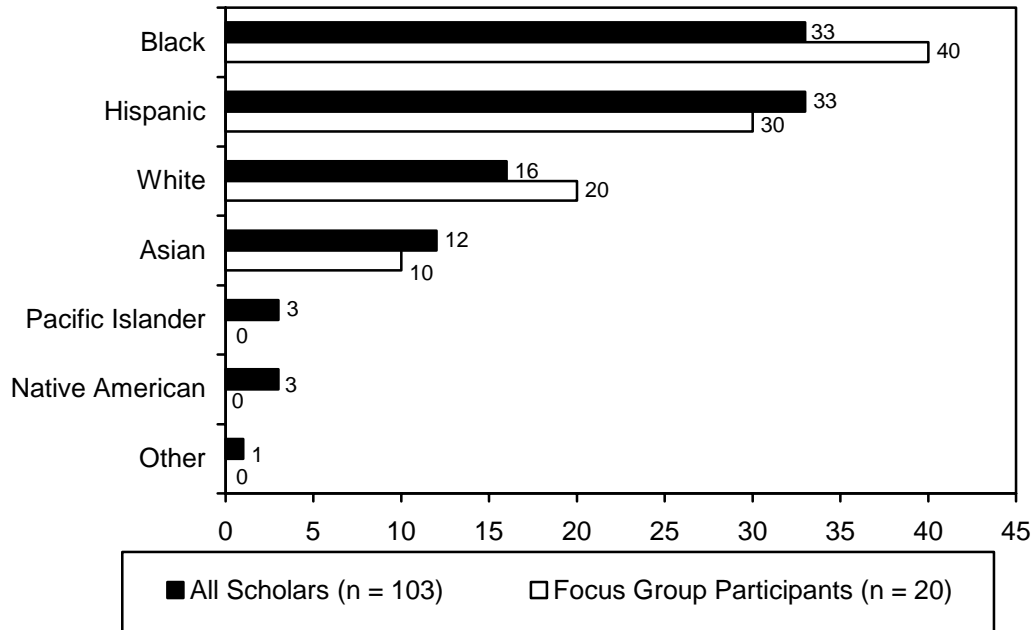
Academic level at time of initial award is not directly recorded in the UGSP administrative database. We estimated this based on the difference between year of graduation and year of initial award; a difference of one year, for example, would indicate that the award went to a senior. In estimating percentages for this variable, two Scholars had to be excluded because their data did not support this type of analysis.

Figure II.4: Years of Funding – Through 2004-05 Academic Year (in percent)



Source: UGSP administrative data.

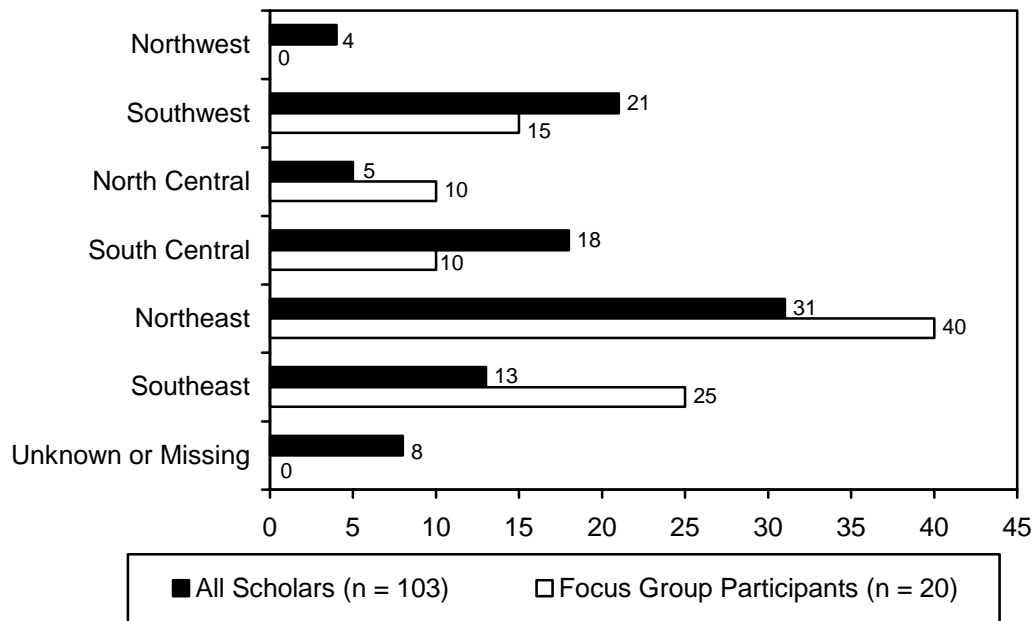
Note: Percentages for All Scholars may not total 100 due to rounding.

Figure II.5: Race/Ethnicity (in percent)

Source: UGSP administrative data.

Note: Percentages for All Scholars may not total 100 due to rounding.

Figure II.6: Home Region – Based on Parents' Address (in percent)



Source: UGSP administrative data.

Notes: Percentages for All Scholars may not total 100 due to rounding. Regional designations are those used by the NIH.

Northwest = AK, ID, MT, OR, WA, WY

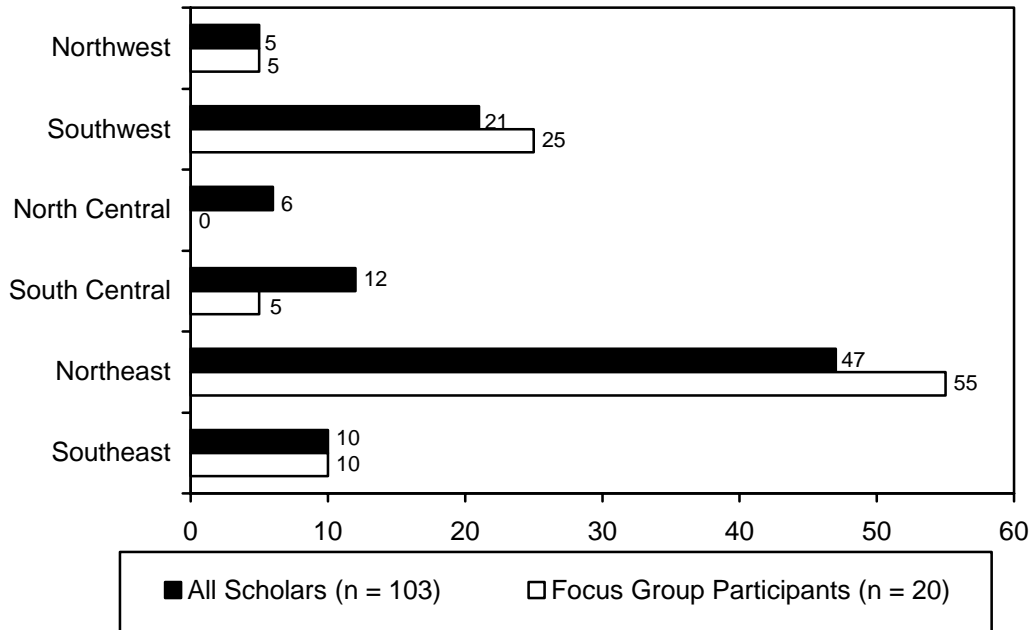
Southwest = AZ, CA, HI, NV, UT

North Central = IL, IN, IA, KY, MI, MN, MO, NE, ND, SD, WI

South Central = AR, CO, KS, LA, MS, NM, OK, TX

Northeast = CT, DE, DC, MA, MD, ME, NH, NJ, NY, OH, PA, RI, VA, VT, WV

Southeast = AL, FL, GA, NC, PR, SC, TN, VI

Figure II.7: Region of Undergraduate Institution (in percent)

Source: UGSP administrative data.

Notes: Percentages for All Scholars may not total 100 due to rounding. Regional designations are those used by the NIH.

Northwest = AK, ID, MT, OR, WA, WY

Southwest = AZ, CA, HI, NV, UT

North Central = IL, IN, IA, KY, MI, MN, MO, NE, ND, SD, WI

South Central = AR, CO, KS, LA, MS, NM, OK, TX

Northeast = CT, DE, DC, MA, MD, ME, NH, NJ, NY, OH, PA, RI, VA, VT, WV

Southeast = AL, FL, GA, NC, PR, SC, TN, VI

VIEWS ON APPLICATION AND SELECTION

What did Scholars find most appealing about the UGSP at time of application? How did they view the potential financial and experiential benefits?

Only a few of the Scholars reported that the financial value of the scholarship had been the main reason they were initially attracted to the program. One of them said that she needed and used “every single penny” the scholarship provided. Another Scholar said, “At the beginning it was the money. Then when I began reading about it, I became more interested in the summer program and the experience that I was going to get.”

Over half of the Scholars said they were primarily attracted to the UGSP because of the opportunity to work at the NIH and what they would gain from that experience. “My motivation was to broaden my network list,” explained one Scholar. “I can come to NIH and meet new people. It’s good to have many friends who are successful.” For another Scholar, the chief attraction was the mentoring. She thought she could get a good summer research experience elsewhere, but saw great value in establishing a “long term relationship with a mentor at NIH,” someone who could tell her what to do to get where she wanted to go. For a few of the participants, the payback obligation—a guaranteed job at the NIH for at least a year—was the primary attraction to the program.

The reason many Scholars were attracted to the UGSP by the experience they would gain, rather than the money, was that they had other means of paying for their schooling. “I already had a full scholarship. I applied for this to get the research experience,” one Scholar said. “I didn’t care about the money this could give me, because I already had that covered.” Eight others said virtually the same thing.

Some of them further noted that the financial benefit of their participation in the program accrued not to them, but to their colleges and other students at the same institutions. “[I]t kind of helped out the school more than it helped me out,” said one Scholar. “[T]hey just took that money and used that for financial aid. For me, I guess the net difference was like zero.” Another Scholar explained that officials at her university “determine the amount of aid that they are going to give you each year and they determine the expected parent contribution. For any outside scholarship you bring in, what they do is reduce the amount of aid that they give you ... [The UGSP funds] didn’t deduct any of the money that I owed them or the amount that my parents had to give them.”

Even though they may not have *needed* this scholarship, a few of the Scholars were bothered by the fact that they derived little or no direct financial benefit because they saw the full-year payback obligation as tied to the high potential value of the award—up to \$20,000 a year. To a Scholar who received less than \$6,000 from the UGSP, the requirement to spend a full year working at the NIH seemed excessive. If participation did not bring them very much funding for college—or not much more than they would have had without the award—then what were they paying back? “If they are going to say, ‘up to \$20,000,’” another Scholar said, “you should actually get that money.” He suggested that if potential applicants really understood that they actually might get much less, it “could steer some people away.” Without prompting, a third Scholar mentioned that the NIH’s loan repayment programs—in which researchers can get up to \$35,000 a year in educational loan debt repaid—might be more appealing for some potential UGSP applicants if they knew about those programs.

How did Scholars view the application process?

The Scholars’ most common recollection, by far, about applying for the program concerned the length of the application form; several commented on the large number of essay questions they had to answer. Some specific types of questions on the application also drew comments from a few participants. Two Scholars, one initially funded as a sophomore

and the other as a junior, felt it was difficult for them to provide good answers to questions about their experiences in science because they had not had that much relevant experience. One of them thought it was ironic to be asked to describe past research experience when applying for a program that she saw as intended for students who may not have had many science-related opportunities. Another Scholar said that questions about working in groups and being a leader gave her the impression that the program would involve a lot of group projects with other Scholars, but that turned out not to be the case.

Scholars in one focus group raised some concerns about the program's applicant ranking system, in which rising college seniors are, other factors being equal, given the highest priority for the scholarship. They saw some potential disadvantages for students who apply to enter the program in their senior year, as two of them had done, relative to those who apply earlier. They felt such students would not be able to leverage the experience to their greatest advantage. Some disadvantages noted were:

- Students who apply for graduate or medical school during their senior year, before they participate in a summer session, would be able to note on their applications that they were accepted into the UGSP, but would not be able to cite specific experiences or indicate that they had worked with specific individuals.
- Until they get to the NIH for their first (and only) summer session and have a chance to talk with peers and others about postgraduate schooling, some seniors may not understand the potential advantages of fulfilling their payback obligation before going on to graduate or medical school. At that point, such Scholars may have accepted admission offers already and made enrollment commitments. As one Scholar explained, "Now I look back on it and think, well, I could have taken a year off, it wouldn't be that bad, but it's too little too late, and I'm already [accepted into] graduate school, with money, so I'm not going to say [to the school], 'Oh, let me [defer].'"

How did academic advisors and NIH summer mentors view the students selected for the UGSP?

The academic advisors we interviewed thought very highly of their students in the program, describing them as having superior knowledge and skills related to biomedical research, at the time they entered the program, compared with other students at the same point in their studies. In the most modest assessment, one advisor described his Scholar as above average, in the top 20 percent of students he had worked with. Most other advisors described their Scholars with words like "very bright," "one of the best," and "working at the level of a graduate student." At the high end of the scale, one advisor said that his student was "on the edge of genius" and that even though she had not finished her postgraduate degree, he would be willing to hire her now as an assistant professor.

The NIH mentors we interviewed also were generally complimentary toward the summer Scholars we discussed with them—though, on the whole, somewhat less so than the

students' university-based academic advisors. Asked to rate the summer Scholars' knowledge and skills compared with those of other college-student summer interns who had worked in their labs, their comments fell into three groups. First, some mentors heaped praise on the UGSP participants, describing them as "clearly superior to all the other students in terms of overall competency," "exceptional, with first-rate scientific ability," and "more enthusiastic for the work and substantially more well-organized than virtually all other summer interns."⁶

Second, a handful of NIH mentors rated the Scholars we asked about as "on par" with other summer interns or generally above average but not in the very top tier. A few of the mentors in this group explained or qualified their ratings by pointing out that UGSP Scholars may not come into the NIH with prior experiences similar to those of other summer interns. One said the Scholar's technical skills were at or above the level she would expect for someone with the Scholar's background, while another noted that a comparison was not necessarily easy because UGSP Scholars often had not had the same advantages or opportunities as most other intern applicants.

Third, a few mentors rated the Scholars we asked about as not quite up to their expected standards, either overall or in particular areas, using words such as "below the competition in both scientific knowledge and research experience, and also lower in mathematics and computer science skills;" "generally below the quality of other summer interns, with scientific skills not up to par;" and, "better in some areas than others, and while independent and enthusiastic, sometimes lacking focus and consistency."

For another perspective on Scholars' relative skills and abilities, we asked the NIH mentors whether they would have taken the Scholars into their labs for the summer if the students had not been part of the UGSP.

- Three said definitely or probably yes, because the Scholars were fully qualified and there was a good fit with the lab.
- Two said no and cited only the Scholars' qualifications: one said she had concerns about the Scholar's aptitude for science and his abilities related to scientific inquiry; the other said his Scholar could not have competed with the many highly qualified applicants he is able to choose from annually, including high school students with perfect SAT scores.

⁶Some NIH mentors also made very positive comments about UGSP Scholars other than the ones we asked about. For example, one described them generally as highly motivated and intellectually equal or superior to most of other students he has interacted with. "I don't know where they get these great kids," he said. "Sometimes I'm totally blown away by them." A mentor who did not strongly praise the specific Scholar we had asked about mentioned that another UGSP participant he had worked with had been "absolutely top notch."

- Virtually all the remaining mentors indicated that their decisions to take on these students during the summer had been somewhat or substantially influenced by the fact that they were in the UGSP, but their rationales were unrelated to the Scholars' knowledge or skills. A few mentors said that when students are affiliated with the UGSP—an established program familiar to them—this helps these students stand out from the many other talented summer job applicants they hear from each year; it gives students an “in” and catches the mentors' attention. A few others explained that a general lack of resources—space, funding, or time to devote to the student—typically prevented them from taking summer interns in recent years, but that for these participants in the UGSP they had made an exception. Additional comments by some of these supervisors led us to believe that their decisions were motivated in part by their general support for the program and by their desire to see increasing diversity among the next generation of biomedical researchers.

What did Scholars think about the option to renew their scholarships and the renewal process?

Fourteen of the Scholars in our focus groups were initially funded before their senior year of college and thus had a chance to apply for renewed funding at least once. Of these, nine had reapplied every chance they could, to date, while five had declined to do so, ending their participation in the program with one or two years remaining in college. Some of the 14 Scholars expressed some thoughts about their decisions.

- For a few, the main reason to renew was financial. “I chose to [renew] simply because of the money,” one Scholar explained. “If school was already paid for, I wouldn't have done it, I don't think.”
- Two others who had renewed their awards said that they wanted to remain in the program primarily because of the good experiences they had in their initial summer sessions.
- A Scholar who had not sought a renewal said she preferred to spend the next summer at her college, taking some courses to lighten her load for the following academic year. In addition, she had made up her mind to fulfill her work obligation right after college, and did not want to delay starting graduate school by more than one year.⁷

Two Scholars expressed some views on the renewal application form and process. On the positive side, one appreciated that the renewal application was shorter and less time-

⁷In a related comment, one participant who was initially funded for his senior year of college said that if he had received the award as a junior, he would not have applied for an extension to cover his senior year, because he would not have wanted to take on a second full-year payback obligation. He thought it was going to be hard enough to fit one year of NIH employment into his plans.

consuming than the initial application. She also felt that as long as Scholars have generally good experiences and their NIH mentors do not give them negative evaluations, renewals are essentially guaranteed. On the negative side, a different scholar felt they should have been given more than two or three weeks' notice about the application deadline, and that their interviews with the program director, after completing their renewal applications, would have been more interesting if the discussion went beyond the questions on the form.

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CHAPTER III

ACADEMIC-YEAR ADVISING

BACKGROUND ON ACADEMIC-YEAR ADVISING

During each academic year in which students receive an NIH Undergraduate Scholarship, they are required to have a faculty member at their undergraduate institution serve as an official academic advisor.⁸ This requirement has been a feature of the program since its beginning, and expectations concerning the advisors' responsibilities have been stable. Academic advisors, according to the UGSP website, "should be able to respond sensitively to the developmental and educational needs of an individual from a disadvantaged background who is pursuing a career in biomedical research." Their responsibilities include:

- Providing curriculum guidance and assisting the Scholar in selecting appropriate courses
- Meeting with the Scholar at least once a month to assess progress and provide advice about any difficulties that may arise
- Completing a sequence of evaluations, provided by the NIH, to assess the Scholar's progress during the scholarship year

In addition, while not a requirement, UGSP officials invite and encourage these advisors to visit the NIH campus at some point during the 10-week summer program, particularly during NIH Poster Day, when the Scholars make presentations about their summer research projects. The objective of these visits is for advisors to assess the Scholars' progress and set goals for the coming academic year, including how to integrate their summer research projects with their academic programs back in college (for those who have not graduated). As an incentive to attend, the NIH reimburses academic advisors for their travel expenses.

⁸Although the UGSP website says that the Scholar's "undergraduate institution must appoint a faculty member to serve as the Scholar's mentor and advisor," program officials expect, in reality, that students will take the lead in identifying a faculty member willing to serve in this capacity; institutional endorsement is seen as implicit.

OLRS officials estimate that 20 to 40 percent of academic advisors ever visit the NIH during the summer session. In addition, although a Scholar may participate in the program for multiple years, academic advisors are unlikely to visit the NIH more than once for a particular student. In the summer of 2004, 6 Scholars out of 15 (12 members of the 2003 cohort and 3 attending for a second or third time) had a faculty member visit the NIH.

Assessing the importance of this component, the program director said that it may not be critical to program success, and may not be important for all awardees, but it can be important for some Scholars. At the start of the academic year, the OLRs sends basic guidance on mentoring to new academic advisors. For the remainder of the year, there is no formal or standard plan for maintaining contact with Scholars' advisors. Contact is made only on an as-needed basis, such as if a Scholar is having academic difficulty. Program officials let Scholar-advisor relationships develop according to the needs and wishes of those two individuals.

Students need not have the same advisor every year they receive a scholarship. Indeed, administrative data reveal that about a quarter of the 40 multiyear scholarship recipients had more than one academic advisor while in the program. Only three faculty members have served as an academic advisor for more than one UGSP Scholar.

VIEWS ON ACADEMIC-YEAR ADVISING

How did Scholar-advisor pairings come about?

Most of the academic advisors recalled that they took on that formal role after their students asked them to do so, and in most cases they did not know in advance that the students were contemplating the program. (Indeed, for almost all of these faculty members, when their students asked them to serve as an advisor for the UGSP it was also the first time they had heard of the program.) The one advisor who had brought the program to his student's attention told him when it came to identifying an advisor, "You can put me down, or anyone else."

Most of the faculty members we interviewed knew the Scholars fairly well before agreeing to serve as their academic advisors for the UGSP. The students had worked in their labs, had taken one or more of their courses, or had previously developed mentoring relationships with them through discussions during office hours. Only one of the nine advisors said he had very little prior familiarity with his Scholar. Although his university had assigned him to serve as a faculty advisor to this student, this "pro forma" role had only brought them into contact with one another for a few minutes a year before she joined the UGSP; she had not taken any of his courses and he did not know her nearly as well as the undergraduates who worked in his lab.

The Scholars reported having varying degrees of familiarity with their academic advisors before they tapped them to serve in that official role for the UGSP. The majority selected someone they already knew well, such as a professor with whom they had taken multiple courses or in whose lab they worked for a year or two. In many cases that person was not

just an instructor or employer, but already was serving as a mentor⁹ or advisor to them, either informally or in some formal capacity. For example, one Scholar said she selected a professor whom she had met at the start of her freshman year, and with whom she had developed a close relationship. “Every Friday I would talk with her, for an hour, about life ... So it only seemed natural to me that she would be my advisor [for the UGSP].”

Two of the participants, however, did not have a natural choice, that is, someone they considered an advisor or mentor before applying for the program. For one of these Scholars, choosing someone she already knew was not an option because she had transferred to a new college for her first year in the program. She selected a professor with whom she took a class in her first term at the new school. Another Scholar did not have any obvious choice for a mentor. Her first choice was too busy, but referred her to another professor. She called him, they met, and, fortunately, they “just clicked.”

One other Scholar said she had five or six people at her college whom she talked with frequently and might have been obvious choices to be her academic advisor, except that their research interests did not align well with hers. Instead, she chose a professor she had never really spoken with (although she had taken one of his courses), because he did research in an area she wanted to explore. She thought that if he were her academic advisor for the UGSP, “it would be a real opportunity to get to know him, because he’s so busy.”

What was the nature of Scholar-advisor relations?

What exactly do academic advisors do for UGSP Scholars? How often do they meet, what do they discuss, and how close are they? How might student-advisor relationships have differed if the students had not been part of the UGSP? These are some of the questions we asked during our interviews with advisors and focus groups with scholarship recipients.

Academic Advisors’ Expectations

It is useful first to consider what expectations the advisors had regarding this role, because expectations can shape actions as well as more generally reflect basic understandings of the program. Several examples are needed to convey the widely diverse ideas of the nine academic advisors concerning what was expected of them regarding their students in the UGSP.

- One said he had “no inkling” of what was expected.
- A second advisor, who said he had only a general understanding of what was expected, saw his responsibility as giving his student more of a scientist’s

⁹Scholars sometimes used the word “mentor” when discussing the person designated as their academic advisor for the UGSP, because it better described the role the person played. When this word appears in this section, it is in reference to the college-based advisors, not the Scholars’ NIH mentors.

perspective on career and education choices than she would get from a regular college counselor or faculty advisor.

- Another, who also said he did not know much about the program, had the impression that program expectations were less than what he already was doing for the Scholar as one of his lab workers. These responsibilities included making sure he learned the literature, as well as animal surgery skills; giving him work that would lead to co-authoring a paper; and helping him achieve his personal and professional goals.
- Yet another felt that the most important thing he could do was to provide research experiences that would make the learning curve less steep when his Scholar arrived in Bethesda for the UGSP summer session. He was less certain, though, about his role for the next year, wondering, for example, whether his Scholar's NIH mentor would be contacting him to discuss possible continuity from the summer session to the following school year.
- Finally, one advisor emphasized keeping the student on track in her studies, as in helping her select the best courses.

As for the expectation that they would have to complete formal evaluations of their students and submit them to program officials, most of the nine academic advisors did not recall being asked to do so.

Finally, as for the option of visiting the NIH during the summer, none of the academic advisors had ever done so at the time of our interviews. (Although two said they planned to do so in summer 2004, we learned later that only one of them did so.) A few of the advisors said they were unaware this was an option—at least, they did not recall receiving an invitation—although when we asked about it, some said it sounded interesting. Some of those who were aware of this option, as well as some who were not, told us that other prior commitments had prevented, or would prevent, them from making the trip to Bethesda.

Advisors' Communication with the NIH

Perhaps one factor contributing to the academic advisors' diverse understandings about what the program expected of them was the reportedly low level of communication between them and UGSP officials. A few advisors recalled no contact at all with the NIH concerning the program. Others recalled perhaps one or two contacts, such as a packet of materials about mentoring, around the time the student was accepted into the program, or an invitation to visit the NIH during the summer.

But the advisors did not indicate that having limited or no direct contact with the NIH was a problem or concern. One of them said he assumed that, whether by design or default, the program office uses the Scholars as the main point of contact and counts on them to provide relevant information to their faculty advisors. Another said that since things went

well for her student during the academic year and summer, there was no need to have a discussion with anyone from the NIH.

Connections Between Scholars and Academic Advisors

Both the academic advisors and Scholars we spoke with described a wide range of relationships in how often they interacted and what they discussed. Some pairs had close relationships, while others were not very close at all. Following are four examples that illustrate the range of relationships reported by academic advisors.

- An advisor who described having a solid relationship with his Scholar said they got together to talk roughly once a month for about half an hour, but not according to a structured plan; it just worked out that way. Topics of discussion included course choices, programs and research opportunities, and career directions (e.g., pursuing an M.D.-Ph.D. versus just a Ph.D.).
- Academic advisors whose Scholars worked in their university labs sometimes had other senior lab staff, such as graduate students or postdoctoral fellows, take more direct supervisory responsibility for the Scholars. These advisors' contacts with their Scholars came primarily through group meetings to discuss the research project, and secondarily through one-on-one discussions on an as-needed basis. One of these advisors recalled meeting perhaps five or six times over the year to discuss his Scholar's future, asking questions to gauge how the student's plans were developing. They did not discuss course options because, given the student's major, there was essentially no question about what the student needed to do.
- Another advisor said he and his Scholar were "not very close." They met about three or four times during the year. He would typically get an e-mail from her at the start of each quarter and then they would get together for a one-on-one discussion lasting perhaps half an hour, during which they would talk about science, her coursework, or her career options.
- One academic advisor described having virtually no relationship with his Scholar. They did not meet on any regular basis during the school year, other than for brief academic advisement meetings that he would have had with her even if she had not been in the UGSP. When we first contacted this advisor, he had difficulty recalling this student at all, or any connection she had to an NIH program.

The Scholars similarly described a wide range of relationships with their academic advisors. At one end of the continuum, some Scholars met frequently with their advisors and greatly valued their support. "[S]he's like my psychiatrist and my academic advisor," one Scholar said. Another described her advisor as "more like a life advisor than just an academic advisor." They talked more about lab work than the UGSP, but the advisor took the student's UGSP involvement into account in trying to foster her professional

development. “She knows that I’m in the program and there are certain things that she will give me, that she won’t give anyone else, because she wants to give me more of a chance. If there is something to write or something to present, she will let me do it. She wants to push me more, because she knows that I’m here and part of her responsibility is to make sure that I make it.”

In the middle of the continuum was a Scholar who worked in his academic advisor’s lab, but only saw him and spoke briefly to him about five times during the year he was in the program, because administrative duties kept the advisor from spending much time in the lab. A revealing sign of this Scholar’s relationship with his advisor was that because he knew his official advisor would be too busy to visit the NIH during the summer, he instead invited another of his professors, someone who was more of a day-to-day mentor to him and who had been instrumental in getting him to apply to the program.

On the low end, one Scholar said of her advisor that she virtually “never met with him, never spoke with him.”

How did naming an advisor affect Scholar-faculty relations?

Requiring Scholars to name an academic advisor generally does not appear to foster better or more intensive relationships between the students and faculty members. Most of the academic advisors told us that agreeing to take on that role officially with regard to the UGSP did not substantially change their relationships with those students. The participant focus groups yielded a similar story about generally consistent relationships. In most cases, the pairs simply maintained the same type of relationship that existed before the students won the scholarship.

- Most of the Scholars who had close relations with their academic advisors before joining the program maintained similar relations afterwards. “I already had a good relationship with a mentor,” one Scholar explained. “The program did not make a difference, because he was already my mentor.” A few other participants said virtually the same thing.
- Similarly, the Scholars who did not have close relationships with their advisors to begin with generally did not report growing closer to them. The advisor who seemed to have the least prior knowledge about his Scholar said their relationship was very minimal before and remained that way after she was accepted into the program.

There were some positive exceptions, however. One advisor and one Scholar told us that their relationships had changed substantially for the better, that the requirement to name an academic advisor led to a close, highly valued relationship that would not have developed otherwise.

- The advisor said that although his Scholar had spoken to him several times when she was in a class he taught, he felt they would not have continued a

mentoring-like relationship beyond that period if she had not asked him to be her advisor after being accepted into the UGSP.

- The Scholar had no prior relationship at all with her advisor, but they seemed to have developed one of the closest working relationships we heard about from any of the focus group participants. She had maintained contact with him after graduation, and they had even collaborated on publications. “It is a really amazing mentor relationship that we have established,” she said, “and the only reason I reached out to him was because of this program.” She even went so far as to say, “I got ten times as much out of finding my mentor for this program than I got from the actual program.”

How did Scholars and advisors view this component of the program?

We asked focus group participants and advisors about the value of requiring Scholars to formally designate a faculty member as their academic advisor for the UGSP, and they gave mixed opinions.

On one hand, a few of the faculty members did not think the advisor requirement was important. They felt that students who wanted a mentor would get one without being required to do so for this program. And some Scholars, including even some who reported having good relationships with their advisors, did not see much connection between their advisors and the program; they did not see a clear or important role for them to play.

- “It seems that other than coming to this summer symposium thing, they really didn’t do anything. It was like they’re just our mentor in name only for this program, because besides that initial recommendation that they asked them to write in the beginning and this last one [for renewal], they really didn’t do anything.”
- “They don’t really have that much responsibility. It was more like a formal thing that I gave them a form and they signed it and then they were my academic advisor. But they didn’t have to do much for the program, I think, other than make sure my grades got sent in, that I wasn’t flunking out.”
- Two Scholars opined that having academic advisors visit the NIH during the summer did not seem very important or beneficial.

On the other hand, four of the advisors said the requirement was a good one. As one explained, having a mentor during the academic year is the best way for students to get all of the developmental experiences they need for their careers; just going to the NIH for one or more summers would not enable them to reach their goals. In addition, although some Scholars may have seen little benefit to having identified an advisor at their college, they did not complain about the requirement or consider it a burden. A few of them, in fact, including two who did not maintain close relations with their own advisors, said the requirement was worthwhile for some program participants, if not all.

- “I think the program wants us to have [an advisor] so we can start thinking about what we want to do in the future and not wait until we come to NIH and get our mentor. I think it is a great idea and I’m glad that they made me go and search for [an advisor]. It made me find out who is at my university, what are they doing, and how I am connected to my university.”
- “Some people don’t have a clue what a mentor is. I think people who apply to this program need to know what mentoring is like.”
- “I can see how, if it’s a younger student, the idea of ensuring they establish a close contact could be good...”

The bottom line seemed to be that while naming a faculty member to hold the position of academic advisor was no guarantee that a useful relationship would develop, the possibility exists that this could happen for some Scholars makes the requirement one that key stakeholders are willing to support.

CHAPTER IV

SUMMER SESSION

BACKGROUND ON SUMMER PROGRAM

After each academic year in which they receive the scholarship, UGSP Scholars must spend 10 consecutive weeks during the summer working in a research laboratory at the NIH campus in Bethesda, Maryland. The summer program is fundamentally about providing undergraduate students with laboratory research experiences, training, and exposure to practicing researchers, so as to foster their interests in pursuing careers in biomedical research, particularly at the NIH. But the summer program also involves other activities intended to build the participants' knowledge and skills and to enhance the group's overall experience. Below we describe the key dimensions and features of the summer session. The second section summarizes the comments of Scholars and mentors on this important component of the program.

Timing and Duration. For most Scholars the summer session starts in late May or early June, on a date selected well in advance by program officials. Scholars whose undergraduate terms do not end in time for them to make that start date, such as those from West Coast schools operating on quarter systems, join their peers in Bethesda about two weeks later. In addition, Scholars may ask to extend their summer stay by one or two weeks beyond the 10-week minimum, but approval of these extensions is contingent on the availability of a same-sex roommate during the additional time. Any extra weeks that Scholars spend at the NIH during the summer are deducted from their full-year payback obligation.

Laboratory Assignments. Program officials make a concerted effort to give all Scholars a summer laboratory assignment that suits their skills and interests. The process through which Scholars are assigned to particular NIH laboratories for the summer session is called "mentor-match." Beginning in October, Scholars are instructed to consult a list of NIH research supervisors posted on the program website and consider which of them might be a good match, given the Scholars' own research interests. Scholars also can express an interest in working with NIH researchers whose work they know but who are not on the website list. In such cases, program staff will contact the specified researcher to explain the Scholar's interest.

The NIH pays for all the new Scholars to visit the Bethesda campus for three days in January to explore placement options. According to OLRs, this is time period when Scholars are most available, typically on break between semesters, and substantial lead time is needed to finalize placements by summer. During the first day and a half, senior NIH staff who are willing to host Scholars in their labs make short presentations to the group, describing their ongoing and planned research. In the remaining day and a half, Scholars visit and have interviews at the labs where they are interested in working. Afterwards, they submit a ranked list of their preferred assignments. Program staff then consult with the would-be mentors and make the final decisions. Nearly all Scholars are given their top choice; that was the case for 13 of 15 Scholars in summer of 2003, for example. No laboratory can have more than one summer Scholar at a time, although a lab can simultaneously host a summer session Scholar and one doing payback. Scholars who plan to fulfill a payback year immediately after undergraduate school use the mentor-match process to find a lab where they can work for both the 10-week summer and the subsequent 52 weeks.

Renewing Scholars need not make the January trip to participate in mentor-match, although it remains an option. Instead, they are encouraged to find potential matches while at the NIH during summer, looking a year ahead. Over the years, about half of all renewing Scholars stayed with the same mentors in successive summers, while about half switched to a different lab.

NIH Mentors. As mentioned above, each Scholar is matched with an NIH researcher who serves as a mentor during the summer program. Mentors are supposed to provide support and advice that will aid the students' personal and professional development, motivating and encouraging them to pursue careers in biomedical research. However, in larger labs especially, a good deal of the daily supervision of Scholars may be delegated to another high-ranking staff member. Mentors also may be asked to assess their Scholars' performance and provide feedback on their strengths and on areas where further development is needed. Mentors,

Positions and Compensation. During the summer, UGSP Scholars are federal government employees (officially, student trainees). Depending on their level of education and experience, they qualify for positions paying roughly \$10 to \$13 per hour. They also accrue annual and sick leave and may purchase subsidized health insurance. Scholars' salaries are covered, and their full-time equivalent (FTE) positions provided, by the Office of the Director of the NIH, not by individual labs. To cover 15 Scholars working for 10 weeks, or 150 weeks total, requires about three FTEs.

Housing. The NIH provides shared housing for all Scholars in a residential hotel located close to the Bethesda campus. OLRs officials pointed out that hotels, while they may sound like somewhat of an indulgence, provide the only good option for temporary housing near the campus. The NIH not only covers the housing costs, but also enables students to avail themselves of a free breakfast daily and occasional dinners; maid service also is provided. Living in these hotel apartments is mandatory for all summer program participants.

Visit by Academic Advisor. As described in the previous chapter, some Scholars' advisors from their undergraduate institution visit the NIH during the 10-week summer program. The rationale for these visits is for the faculty members to assess the students' progress and set goals for the coming academic year, including how to integrate their summer research project with their academic program back in college.

NIH Safety Courses. At the start of the summer, the Scholars are required to complete a set of short courses to promote safety: Laboratory Safety for Summer Research Associates, Working Safely with HIV and Other Bloodborne Pathogens in the Research Laboratory, Radiation Safety, and Ethics for Biomedical Researchers. These courses are mandatory for all lab staff throughout the NIH.

Program Activities. Although the Scholars' main responsibility during the summer is to conduct laboratory research, they also are required to participate in a variety of program-sponsored activities and meetings to support their professional development, which program officials consider an important part of the overall experience. The main set of activities, known as the UGSP Summer Workshop Series, involves two 90-minute meetings per week, held in the evening.¹⁰ Typically, one meeting per week involves a scientific presentation and research discussion led by an NIH scientist or outside guest speaker, while the other is designed to sharpen the Scholars' skills or enhance their professional development. For example, past sessions have focused on public speaking, writing for science, and applying to medical or graduate school. The speakers and topics vary from year to year in response to feedback provided by Scholars and to the director's sense of what would benefit them.

Other program activities are designed to organize the summer, honor the Scholars, and allow them to get to know one another and various NIH staff and officials. Examples include a group dinner with the program director; an orientation session; a more formal welcoming ceremony; a casual lunchtime meeting at which the summer session Scholars can meet the payback Scholars and ask questions about the program, graduate school applications, or any other topics; and an end-of-summer recognition event that serves as a closing ceremony.

Poster Day. Toward the end of the summer, all Scholars prepare and present a poster describing the research project they have been working on. The posters are displayed in a large room and academic advisors, NIH mentors, program officials, other NIH officials, and Scholars in payback are invited to review the posters and ask questions of the summer Scholars. In a sense, Poster Day represents the culmination of the summer session, considering that the Scholars' devote considerable time and effort to preparing for the event.

¹⁰This has been the case for several years, although in the program's earliest years, Scholars had to attend organized activities almost every day.

VIEWS ON THE SUMMER EXPERIENCE

How did Scholars and NIH mentors view the mentor-match process?

Scholars' Perspectives

Overall, the mentor-match process seemed to work well for most of the Scholars. Perhaps the best evidence for this is the fact that most of the Scholars ended up having good experiences in the labs to which they were assigned, a topic we will turn to more directly below. But first we summarize Scholars' comments about the process itself and how they went about selecting their labs.

On the positive side, some Scholars were happy and impressed with the general efforts of program officials in helping the group find suitable arrangements for summer employment. They described them as responsive and helpful, doing whatever they could to accommodate Scholars' interests and scheduling needs: officials flew them into town for the event; arranged for potential mentors to make presentations or conduct interviews, even if they were not on the original list; and rearranged return flights so that Scholars could extend their stays and participate in additional interviews.

Additionally, many of the Scholars found the general process and the available information as useful in identifying potentially interesting matches and specifying a preferred mentor and lab. For example,

- A Scholar in a recent cohort liked being able to see a spreadsheet showing which Scholars had worked in various labs in earlier years. She examined the extent to which Scholars returned to the same lab in subsequent summers or for payback, considering that to be an indicator of where they had good experiences.¹¹ She interviewed in three labs that had had “repeat customers” and picked the one that best matched her interests.
- A participant in an earlier cohort, apparently before the spreadsheet was available, felt that information on the NIH website was sufficient for identifying labs where she could fulfill her research interests.

Some Scholars, however, relied on different means to choose their first lab assignment, or supplemented the mentor-match process with their own search activities.

- One participant had relied on her university-based academic advisor to help her select an NIH mentor and lab. Her advisor “called some of his friends [at NIH] and hooked me up. I did not know that much about the lab, but I trusted my mentor and he would know what would be a good place.”

¹¹As we discuss later, inter-lab mobility does not necessarily indicate poor experiences.

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- Another Scholar did not select any of the mentors who had presented at mentor-match, because she was interested in something specific and found a mentor on her own.

The focus group participants also made some negative comments about mentor-match. A relatively minor criticism voiced by two Scholars, from cohorts several years apart, was that the presentations that were supposed to be 15 minutes long occasionally lasted much longer. A more substantial concern was the ability of Scholars to reliably identify in January a good lab assignment for summer, given the uncertainties that may surround institutional scientific research.

- One participant, for example, spoke of visiting several labs and asking questions such as, “Who am I going to be working with? What kind of projects will I have? What techniques will I be learning?” But she was disappointed to find that staff in most of the labs could not give her solid answers. They told her, “We have people here to work with you, but we cannot tell you specifically who you are going to work with because that depends on what project you get and we don’t know how things will develop in the next six months.”
- Two Scholars voiced the opinion that, realistically, mentor-match will not always work out well for everyone in leading to a good summer research experience; it is a good process, but not perfect. “Mentor-match is a good idea in theory,” one of them stated, “but from that short time, you can’t really grasp what your experience is going to be like. You may talk to people and ask them how it is in this lab, but you don’t know if they’re telling the truth. You have to get there and experience it yourself. You can’t find out what it’s like until you’re there.”

Some Scholars with more than one year of funding had worked, or will work, in different labs in successive summers and cited different reasons for doing so. In some cases, switching labs had to do with learning from their initial experiences, asking different questions, and making different choices, and perhaps wanting to work with mentors with different demographic characteristics. For example, one Scholar told us that she would consider different issues next time, including gender, work style, and work schedule, especially in light of advice she garnered from a summer presentation on mentoring. Other Scholars had used their multiple summers at the NIH simply to explore different research fields each year. A participant explained that while she had had a good experience in one year and would have been happy to go back to that lab again, she also had wanted to try a different kind of research the next year, and she was glad she had. Although she learned that the new area was not for her, she had appreciated the chance to practice certain skills, said she loved the people she worked with, and called it a good experience.

Mentors’ Perspectives

When asked a general question about potential ways to improve the UGSP, two of the NIH mentors made comments about the mentor-match process. All of their suggestions addressed ways to ensure good matches between Scholars and labs:

- Allow a bit more than 15 minutes for presentations to the Scholars
- Create opportunities for Scholars to tour several labs before they have to name the ones where they would like an interview
- Allow more time for lab staff members to get to know the Scholars
- Provide potential mentors with curricula vitae for all the Scholars (perhaps make them available online, as is done for another NIH intern program), so NIH staff have more information about the students they will be talking to and possibly interviewing

What did mentors see as their responsibilities during the summer session?

All of the mentors understood that the Scholars needed to work on a research project, and a few referred specifically to research that would lead to a poster presentation toward the end of the summer; one of the mentors even said he personally liked to help prepare Scholars for those presentations. Furthermore, they all seemed to understand that the research experience should help the Scholars achieve multiple objectives. On the more practical side, they wanted to be sure the Scholars developed their research skills, from understanding the research process in general—creating a hypothesis, collecting data, and so on—to gaining experience in specific techniques and applications. On the more conceptual side, several of the mentors felt that showing Scholars “how real science is done” is one of the most important objectives of the UGSP. One mentor, for example, wanted the Scholar in his lab to realize the obligations inherent in a scientist’s career—for example, that experiments need to be tended at night and on weekends—and that apparent failure is part of the process. Finally, a few mentors also saw their roles to include being a helpful information source for their Scholars by answering any questions or helping to resolve any problems.

The mentors we interviewed typically did not see it as their personal responsibility to work directly with the Scholars, overseeing their work in the lab. Because of their many other responsibilities, most of the mentors rely heavily on other lab staff—particularly postdoctoral fellows—to supervise Scholars in their day-to-day research activities. Only one mentor, in fact, said her role was to directly supervise the Scholar in her lab. Others described the role more as that of a facilitator or a secondary supervisor. To illustrate, one mentor described his role as chiefly making sure his Scholar felt that she was integrated into the lab and that she got the most out of her clinical research opportunities. Another mentor said his first responsibility was to see that someone else was available to help the Scholar, someone with time and interest in playing the lead mentor role.

What did Scholars think about their summer work experiences in NIH labs?

Overall, most Scholars were happy with their experiences working in an NIH lab during the 10-week summer session. A few Scholars offered virtually unqualified positive assessments, such as the participant who told us, “It was really great. I had a lot of freedom

to do what I wanted. They loved me, they gave me an office, and it was great.” Others gave balanced assessments; for example, after describing a minor problem, following up with a statement such as, “Other than that, it’s been really good.”

Interestingly, while some of the mentors’ comments conveyed a sense that Scholars needed to learn what the life of a research scientist was all about, including the high level of commitment required, some of the Scholars’ comments indicated that they were relieved to discover that lab work—and lab staff—may not be quite as intense as they had imagined.

- “When I first came here I thought I would be worked to death,” but she was pleasantly surprised to discover that other lab staff had a fairly relaxed attitude and worked reasonable hours. “I had all these thoughts in my mind about what working at the NIH was going to be like, and then I came here and it was just like working with normal people who are kind of fun.”
- Given that it was his first experience of this sort, a participant told us, he felt very lucky to get into “a good lab,” where the staff were welcoming and nice. “They work really hard, they’re really productive, and they publish a lot of papers, but there’s happy hours, lots of birthday parties and things like that.”

One of the themes that emerged from the focus groups was that some Scholars were not fully challenged in their lab research assignments. In some cases, this appeared to be due in large part to their own choices.

- One participant explained that he had set modest goals for the summer that he thought would be attainable. In particular, he wanted to learn certain basic research techniques. He succeeded in learning those techniques within two weeks, he said, and gave the impression that he may not have been particularly challenged during the remainder of the summer.
- Another participant thought that telling about her summer experience might help future Scholars to make good lab choices. “I felt like I put myself in a box when I was doing interviews for mentor-match. I looked for people who did exactly what I had done in the past. But now that I’ve come here for the summer, I was really bored with my project because it was stuff I’d already done before. I wish someone would have told me, ‘Hey, don’t do that, don’t pick people that do the same things you’ve already done. Go a little further from your comfort zone. It’s okay if you don’t know everything.’” She had considered trying a less familiar area, but was worried that other lab staff would have much more advanced skills. “I didn’t want to be seen as the slow girl in the lab, so I picked stuff that I knew already. But I would have liked to have had a different experience.”

In other cases, however, the issue seemed to be low expectations or underestimations by supervisory staff about what the Scholars could accomplish.

- “My PI [principal investigator] had this perception of what summer students do,” a participant explained. “And I guess he’s just had really bad summer students in the past, but he just assumed that there was, like, a set number of things that could be done in a week and nothing more...” By working hard she was able to complete her tasks more quickly. It took her PI a while to adjust his expectations upward, and she also came to realize that she could “chill out and not go so fast.”
- A few other Scholars had similar impressions and experiences themselves, or knew of a peer who had been treated “like a high school student.” One Scholar said she learned to stretch out her tasks to fill the day to avoid being bored in the afternoon; after she finished one research task, she could not start another until the next day.

Preparing for Poster Day may not have been particularly noteworthy for some of the Scholars, but for others it was a significant undertaking. For some of those who spoke up about it, the exercise did not seem well integrated with their primary duties. One participant, for example, described it as a lot of extra work that was a distraction from her lab work. A second Scholar said she ended up “losing about a week” just to prepare her poster. A third said it took a while to adjust to his lab and get a project under way, and then before he knew it, he had to print his poster. “So my poster is basically two weeks of work, and I had to use someone else’s data in order to fill it out.”

The time required (and available) to compose a poster was an especially salient concern among Scholars who started the summer session two weeks later than their peers, because they had to present their work on the same day as the others. They described themselves as more stressed than the others by this program requirement. “The last week before the poster was done I did not get home earlier than 2:00 a.m.” one of them recalled. “I finished my poster at 6:30 a.m. the day I had to print it out. I did not sleep. I crashed after that ... It was too much work, my study was too big, with too many samples.” Still, despite the difficulties involved, another of the late-arrivers said it was a good experience to have to summarize what they did in the summer.

What was the nature of Scholars’ relations with NIH mentors and other staff during summer?

Scholars’ Perspectives

Scholars described a wide range of experiences regarding relations with their official mentors and other staff working in the same lab. The type and level of interaction varied considerably, as did the degree of teamwork and the extent to which the Scholars may maintain contact with lab personnel in the future. In some cases it was clear that Scholars’ reactions had to do with their expectations going into the situation.

A few of the participants described good, close working relations with their mentors. “I work with my PI on everything I do,” one said. Sometimes they cited factors that may have helped.

- “I met mine at the mentor-match and it was an awesome match from the beginning. It was a really cool experience working with him and people in his lab. I thought he was an incredible mentor. We had similar interests, from liking the same [sports] team to scientific interests.”
- “It was a good experience and I loved the people I worked with. It is really nice to be working with women, because in the past I have always worked with men and there is a barrier and sometimes you can see that they kind of talk down to you, but it is a different experience working with women.”

At least one Scholar had been pleasantly surprised by the degree to which she was able to interact with her mentor: “When I got here, I didn’t think that I would be seeing the PI that I was assigned to at all. I guess I had the perception that this is NIH and they’re busy doing all this other stuff, and you’re not going to be able to see them. But I see my mentor every day and I even have a set time to sit and talk to him about my project, so that was really good.”

Others had found that close proximity to one’s mentor did not necessarily translate into close relations. One Scholar said that in her first summer, although her mentor’s office was in the same lab where she worked and she saw him daily, she did not interact with him very often.

At least one participant was considerably disappointed not to have had a close working relationship with her mentor. In arranging for a mentor, she did not know that person would not work directly with her as he may have with Scholars in earlier years. Administrative responsibilities kept him largely out of the lab and she worked with a lab technician instead. This person had taught her a lot, but was of limited help regarding her future career, because he had not gone to graduate school.¹² Near the end of summer she said of her chosen mentor, “I have talked to [him] twice.” Her disappointment at “not having interaction with the person that I really wanted to interact with ... [who] had accomplished so much...” would lead her to choose a different mentor the following summer.

Another Scholar had known from the start that she would work be working directly under the supervision of a postdoctoral fellow (postdoc), as opposed to her mentor, but about four weeks into the summer, the postdoc left, changing her circumstances and her experience. “My first few weeks were wonderful,” she said. “My postdoc was very

¹²Working with different types of supervisors also may affect Scholars’ abilities to remain in contact with those individuals. Another participant who worked directly with a research technician said it might be difficult to stay in touch with her because she changes labs somewhat frequently.

demanding and really pushing me to do things. I learned a lot..." After he left, she missed having someone to work closely with. "The postdoc... was the only one conducting experiments and after he left I was supposed to keep up the work."

For some others, the lack of a close working relationship with their designated mentors was not much of a concern: "I was happy with my situation overall. The mentor was away for a fair amount of time but I did not hold that against him, because when I did get the chance to talk to him it was a good relationship. I am going back to that same lab next summer."

Finally, a few participants described working mostly independently, which they did not necessarily see as a problem.

- During his first three weeks in the lab, one Scholar recalled, he got a lot of attention from two postdocs who were working on the same project, but later he became more independent. He characterized it as "teamwork of a sort, but not everything together in a group."
- "In my lab it seems like everybody's working on different aspects of the project. Sometimes they may collaborate with people in other labs, but nobody in the lab is working together. So I'm just working with one guy. The first time I did something, he watched over me, but after that I just did it myself."
- "I don't work with anybody; I just do my own thing..."

Mentors' Perspectives

Most of the mentors we interviewed had not worked very closely with their Scholars during the summer session. As one mentor explained, he oversees too many people and projects to form close working relationships with summer interns. Two other mentors mentioned travel schedules or administrative duties as factors constraining their ability to spend time with UGSP Scholars during the summer. Day-to-day, direct supervision of Scholars in the lab typically falls to a senior staff member, such as a postdoctoral fellow. Mentors mainly keep in touch with Scholars in the same way they do with other staff in the lab—through brief, informal discussions about the ongoing research, or through regularly scheduled lab meetings, which would involve more formal reports on research activities. A few mentors also explained that they have an "open door" policy and invited Scholars (and all lab staff) to see them whenever questions or issues arose. The overall frequency with which mentors interacted with their Scholars during the summer varied. A handful of mentors reported seeing their Scholars daily, although these interactions were typically brief; a few recalled seeing them two to three times a week; and a few recalled just once-a-week meetings.

Beyond overseeing research projects, almost all of the NIH mentors we interviewed said that they had discussed education and career options with their Scholars, either through impromptu discussions or in planned meetings. In general, they took a casual, unstructured

approach to these discussions, responding to Scholars' questions and informational needs. Graduate school and medical school options were common topics. Some mentors recalled discussing specific schools the student might have been considering; others recalled discussing the application and interview process. One mentor with an M.D. and Ph.D. recalled discussing the pros and cons of entering that type of joint degree program.

For one more indicator of the nature of relationships established between mentors and Scholars during the summer, we asked several of the mentors about the extent to which they kept in touch with their Scholars after the summer, when they returned to undergraduate school or started their graduate programs.¹³ They typically recalled receiving one or two e-mails from their Scholars, most commonly asking for letters of recommendation, which they were happy to write. Two noted that they heard more often from other Scholars they had previously worked with than the ones we were asking about. One mentor noted in our March 2004 interview that he had not heard from his Scholar since the previous summer, but expected to hear from her relatively soon regarding the possibility of her returning to his lab during summer 2004.

What challenges were associated with mentoring UGSP Scholars during the summer?

About half of the NIH mentors said that hosting a UGSP Scholar in their labs for the summer posed no particular challenges. Two of them attributed this to the UGSP Scholars being generally quite bright, and probably better, on average, than undergraduates who come to the NIH through some other program. In a related perspective, one mentor said it depended on the particular individual; one Scholar she had worked with during summer was not at the level of others and thus required closer attention and more assistance.

The remaining NIH mentors identified the following challenges associated with having UGSP Scholars in their labs during the summer:

- Having Scholars leave the lab to attend UGSP activities that were scheduled at the same time as weekly lab meetings.
- Identifying a proper-sized, discrete, and meaningful project for Scholars to work on, that could lead to a poster presentation after just eight weeks. The realities of lab research projects mean that, unfortunately, many Scholars must work on part of a larger and much lengthier study and then present a poster about a project on which they had relatively little involvement.
- Integrating into the lab someone with less experience and expertise than regular lab staff, and getting the Scholar up to speed on a project in a short time.

¹³The question was not relevant to some of the mentors because their Scholars stayed on in their lab after the summer to start a year of payback.

How did Scholars view major program activities in summer?

Since Scholars complete feedback forms assessing each presentation they attend, program officials undoubtedly have a better sense of how specific past activities have been received than we can provide based on focus group discussions. In this section, therefore, we focus on larger themes or concerns, using specific examples to highlight issues that may not have shown up on written evaluation forms.

The general theme that emerged from the discussions was that while there was much that the Scholars enjoyed about program activities, they saw some room for improvement. To the extent that they offered criticism, they often balanced it with praise. For example, a member of one of the earliest cohorts thought that the large number of talks they had to attend was “overwhelming,” in terms of the energy required to listen attentively after a long day in the lab. “But to be fair [about] those talks,” he added, “the quality was amazing and the people they brought in were really good.”

The Scholars’ compliments and constructive criticisms made clear that they enjoyed speakers and activities that were relevant and timely for them and their current and future experiences; lively and interactive, as opposed to seeming like lectures; not too time consuming; and that they can relate to both personally and professionally.

Relevant and timely for their present and future circumstances:

- Two of the Scholars felt that some guest presenters may have been under the misperception that all the Scholars worked together in a group, so the group exercises they had the Scholars do seemed not entirely applicable.
- A 2004 summer Scholar praised a talk on mentors and mentoring, but said it would have been more helpful in January, in connection with mentor-match. She felt she would have had a better summer research experience if she had known what she knows now about choosing a mentor.
- One participant said that the second or third week of the summer was too early to have sessions on preparing posters. At that point, she said, “Most of us don’t even really know what we’re doing yet ... If it was condensed so that you were doing that more towards the end of the summer, it would be more useful, because you would be thinking about your poster then.”
- A few Scholars mentioned that they enjoyed the session on applying to medical school or graduate school; most of them would be doing that in the near future.

Relevant to them on a professional level:

- Several Scholars from different cohorts commented very positively on the sessions that dealt with public speaking. They felt that these sessions could be stressful, such as when the instructors would stop them in the middle of a

presentation and have them start over, but that their skills definitely improved. Some even said they liked it so much, they wished there were more such sessions, including additional opportunities to review videotaped speeches in small groups and pinpoint areas for potential improvement.

- One participant thought that the mandatory NIH training on general lab safety was “redundant” for most Scholars, because they already knew basic safety rules from prior lab research experiences. She and another Scholar also felt that training on bloodborne pathogens and radiation safety were irrelevant to those not working with such materials.
- Because the Scholars study and do research in so many different areas, they recognized that not all of them would have an equal understanding of, or interest in, detailed presentations on certain types of research. Exposure to new subjects could be useful and appreciated, as reflected by this comment: “I don’t have a very strong biology background, so I learned by having to listen to these biologists talk to us.” But others said they would appreciate more emphasis on the big picture—a “survey of what’s happening in the field,” “[more on] how this is going to help with cancer or HIV, et cetera”—than on the narrow details of findings from particular experiments.

Relevant to them on a personal level:

- Some Scholars especially appreciated the chance to hear scientists talk about their lives. As one said, “I benefited a lot from their life stories ... the time it took and the fact that their career paths were not just straight lines.”
- A few Scholars expressed an interest in having a broader range of speakers in terms of gender and/or ethnicity. For example, one would have appreciated hearing from women scientists about the challenges of balancing a lab career and family, while another suggested recruiting more Latino speakers.

Not too time consuming:

- Some Scholars complained that the mandatory NIH safety courses at the start of the summer not only took up a lot of time in general, but made it more difficult for them to get established in their labs. “To have to say to your mentor, whose lab you’ve only been in for two days, ‘By the way, for the next week I won’t see you from 9:00 to noon,’ that’s a bit tough,” a Scholar said. She thought it would be better to bring the Scholars to Bethesda earlier and cover all the sessions on a weekend before they begin working in their labs.

Lively and interactive:

- Scholars liked sessions that provided them with ample opportunity for questions and discussion, and to interact with the speakers and one another. Given that

evening sessions take place after a full work day and after dinner, they pointed out, lively and interactive sessions have a greater chance of keeping their attention than, say, an extended slide show. Recent summer attendees generally did not like a particular presentation in which the speaker talked for 75 minutes straight, and simply presented material they could have read for themselves. In contrast, some mentioned liking the lunchtime session in which new cohort members got to seek advice from their predecessors in payback.

How did Scholars view other aspects of the summer session?

Summer Housing and Social Connections

Scholars voiced mixed opinions about their housing for the summer. Two of them said that living in a residential hotel was certainly nothing to complain about. They enjoyed the amenities. But a few others seemed almost embarrassed by the situation, saying, “I actually thought it was too much for us,” “I just don’t think it was necessary,” and “I actually didn’t really like the housing. It seemed almost too nice.” Two said they would have been satisfied and felt more settled-in if they had lived in more traditional housing. Even the reluctant critics, however, saw some advantages in the arrangement, including facilitating official group meetings and, importantly, increasing the chances for bonding among peers.

Some multiyear Scholars, though, noted that social dynamics in summer could vary considerably from year to year. They had seen some groups grow closer and seemingly have more fun than others. Influential factors included individuals’ personalities, their other competing pursuits (such as studying for the MCAT), how Scholars were spread about or clustered in the hotel (some Scholars in different cohorts wished their groups had been more closely clustered, on a single floor, for example, to increase interaction opportunities) and the availability of places to hang out, such as the living rooms in “triple” hotel suites.

A few participants also noted that those who started the program two weeks later than the others faced a substantial challenge in fitting into the program and the social networks that had already formed. Latecomers might integrate better with their peers, two Scholars commented, if they were assigned to share housing with those who arrived earlier, rather than with each other.

Overall, a participant said, meeting other Scholars and developing friendships was “one of the best things about the program.” Each summer she attended, she went back to college “changed for the better because I learn so much and meet people that have gone through so much.” She expects to keep in contact with other Scholars for quite some time.

Program Duration and Scheduling

Several Scholars commented on how quickly the summer session passed. When they added up all the activities that did not seem part of the core experience of conducting research, some of them felt there was not enough time remaining to achieve a real sense of accomplishment. One participant described how, with much of the first week spent in

orientation and training, and up to another week spent on the poster, the summer essentially came down to just eight weeks of lab work. She felt she still had more work to do at the end of the session and wished she could have extended her stay. Similarly, the Scholar cited earlier, who described having to rely on someone else's data for his poster, said he wanted an extension "in order to get something done and feel at peace;" if he were not granted an extended stay, he said, he would be "really frustrated."

Accordingly, these Scholars expressed a wish for more flexibility to slightly extend their stays at the NIH. They wished it were not dependent on the availability of a same-sex roommate because they knew that could not be counted on. One suggested that, to help with logistical planning, Scholars could be allowed to sign up for a 10-week or 12-week summer session well before the session starts.¹⁴

Two other participants supported the concept of more scheduling flexibility for slightly different reasons and circumstances. They suggested that allowing Scholars to start earlier and/or end later would better accommodate their needs during transition periods such as between undergraduate school and the summer session, or between the summer session and the following school year.

¹⁴Program length was also a concern to some mentors. When asked how they might like to see the UGSP changed, two of them mentioned making the summer longer, even by one or two weeks, to allow more time for research.

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CHAPTER V

EMPLOYMENT AT THE NIH AFTER GRADUATION

BACKGROUND ON THE POST-GRADUATION EMPLOYMENT OBLIGATION

For each academic year in which they receive a scholarship, UGSP Scholars must spend one year (52 consecutive weeks) working at the NIH. This chapter begins by describing the basic features of this service obligation, and then discusses stakeholders' views on this experience, collected through interviews with NIH mentors and UGSP staff, and focus groups with scholarship recipients at various points in their careers.

Timing. Scholars must begin their payback service within 60 days after undergraduate graduation, unless a deferment is granted. Deferments are allowed only while Scholars are pursuing NIH-approved postgraduate studies and training. A Scholar may not, for example, defer payback in order to travel or work somewhere other than the NIH. Scholars granted deferments must begin payback within 60 days after completing their postgraduate studies and training.

Scholars with two or more years of payback to do need not complete them all in one stretch. For example, a Scholar with a two-year service obligation could work at the NIH for one year immediately after undergraduate school and defer the second year of service until after graduate or medical school. Some Scholars have done this. A few Scholars have deferred their commitment to go immediately to graduate or medical school, taken a break to do some or all of their payback, and then returned to their postgraduate program.

UGSP officials would prefer UGSP Scholars to defer their payback until they have completed their postgraduate studies and training, and the program director said he conveys this perspective to the Scholars. The reasons cited include the following:

- Scholars who have completed an M.D. or Ph.D. or other postgraduate degree provide more value to the NIH than those who have yet to start or complete such a program.
- The chance that the NIH will retain Scholars who fulfill their payback after their postgraduate studies is greater than the chance that those who fulfill their

payback earlier will return to begin their careers there after completing their studies.

- Even if Scholars who defer their payback decide not to remain at the NIH after fulfilling their obligations, they will be more valuable in the job market having just worked at the NIH for a year or more, than having worked there before graduate school, several years in the past.

As of summer 2004, 88 Scholars have completed their undergraduate studies. Of these, 38 (43 percent) have chosen to begin their payback service right away. Overall, 33 Scholars have completed their payback. Only one Scholar who deferred all payback while in graduate school has come back to the NIH and completely fulfilled that obligation. More Scholars will be in this category in future years; few Scholars have reached that point yet, because the program is still relatively young and postgraduate programs can take many years to complete.

Laboratory Assignments and Mentors. Scholars are expected to fulfill their full-year service obligations in an NIH intramural research laboratory. In addition to the Bethesda campus, placement opportunities include Poolesville, Frederick, and Baltimore, Maryland; Research Triangle, North Carolina; Hamilton, Montana; and Phoenix, Arizona. Senior NIH researchers serve as mentors to Scholars in payback, just as in summer, overseeing their work in the lab. UGSP staff advise Scholars on finding a full-time research position, including pointing them toward listings of job openings, but the Scholars themselves are responsible for seeking a position that suits their interests and skills.

The process of selecting a lab and mentor differs depending on the timing of payback and the years during which a Scholar is funded by the program. For example, Scholars who receive funding during their junior year of college and want to do their payback right after graduation would typically be expected to identify a match during the summer session before their senior year. If they also extend their scholarship to cover their senior year, they will be looking for a setting where they will work for at least 15 months—a summer session and one or more full years. Attending mentor-match in January remains an option for those who feel it is necessary to ensure a good match. For Scholars who defer their service and will be returning to the NIH after potentially many years in a postgraduate program, the January mentor-match process is also an option, but they can also arrange an individual visit and interviews at any convenient time.

Program Activities. The Scholars' main responsibility during payback is to conduct research, just like other full-time, regular employees of the NIH in similar positions. Until 2001-02, that was their only obligation. Since then, however, program participants have been expected to participate in monthly meetings with the UGSP director. One focus of the group meetings is to discuss participants' ongoing research projects. Other topics are selected to meet the participants' needs and interests; examples have included stress management and applying to and financing medical or graduate school. These meetings were not instituted earlier, the director explained, because in prior years not enough participants were in payback at any one time to form a good-sized group.

Positions and Compensation. The type of position and level of compensation that Scholars qualify for during their payback years depends on the level of training they have completed. Those who choose to fulfill their obligation right after graduation from an undergraduate program, with a B.A. or B.S. degree, would generally be eligible for entry-level or trainee research positions as biologists, microbiologists, chemists, or computer specialists. For Scholars who began payback in 2003, the expected starting salary was about \$26,000 to \$28,000.

Scholars who defer their service until completing a Ph.D. or M.D. may be eligible for post-doctoral fellowships, training positions that paid about \$34,000 to \$44,000 per year in 2003, depending on the individual's education and experience. Two basic options, or pathways, are available. In the Laboratory Research Pathway, staff engage in pure laboratory research. To pursue this pathway, individuals must have either a graduate doctoral degree (Ph.D. or M.D./Ph.D.) or a professional degree (e.g., M.D., D.O., D.D.S., Pharm. D, or D.V.M.) and previous laboratory experience. The Combined Clinical and Research Pathway provides clinical subspecialty training and training in clinical and/or basic research. This pathway is open only to individuals with a degree in medicine or dentistry.

The OLRS, via the Office of the Director of the NIH, has always paid the salaries of UGSP participants during their payback year(s). Originally, it also provided the FTE positions for payback Scholars, but that policy was changed in recent years, as the office had fewer FTEs at its discretion. Now, each institute or center (IC) hosting a payback Scholar must provide the necessary FTE position from its annual allotment. Program officials report, however, that this requirement is increasingly problematic as ICs find spare FTEs harder and harder to come by.

Other Benefits. Scholars who do not have their own computer equipment may borrow a laptop computer and a printer from OLRS to use during payback. The UGSP also will consider requests to pay the costs of tuition and books for Scholars to take graduate-level courses offered by an approved provider on the NIH campus.

VIEWS ON FULL-YEAR EMPLOYMENT AT THE NIH

How did mentors view the payback mentor-match process and results?

For six of the NIH mentors we interviewed, the payback Scholars we asked them about had started working with them during the summer after college graduation and remained there for a longer period of time. These mentors knew, when the Scholars joined them at the start of the summer, that they would be there for at least 15 months. The remaining mentors were matched with their payback Scholars through both formal and informal processes. On the formal side, two of the mentors recalled that their Scholars had contacted them to express interest in working with them—in one case, after hearing the mentor make a formal presentation during the mentor-match process—and interviews followed. On the informal side, one mentor had taken over supervision of a Scholar from another researcher who had left to do a different type of research; another mentor took back a Scholar who had

worked with him during an earlier summer session and, because he knew her, an interview was not necessary.

Most of the mentors we interviewed were satisfied with the abilities of the Scholars they took on for a year of payback. Of the seven mentors who had not worked with their full-year Scholars in the immediately preceding summer, most rated the Scholars in their labs as on a par with other full-time employees they had worked with at the same point in their education and career. (We did not seek the opinions of the five mentors who worked with the same Scholars for 15 straight months, figuring that their assessment of these individuals at the start of the one-year payback period would be essentially the same as their assessments of these individuals at the start of the summer session, 10-12 weeks earlier.¹⁵) Two mentors felt the Scholars' skills were slightly less advanced than those of other new postbaccalaureate students they had employed, and one felt he had no basis for making a judgment, since the Scholar in question never put forth enough effort in the lab for him to assess that individual's skills.

Two of the mentors felt they did not end up with good matches, despite thinking, initially, that the Scholars would work out fine—that is, despite the fact that the Scholars had passed whatever screening and selection processes the mentors had used. One discovered that her Scholar had a medical condition making it difficult for the individual to safely conduct the research that needed to be done in that lab. The other mentor reported that his Scholar, whose career interests had evolved in a direction very different from biomedical research, was “unwilling to put in a reasonable effort” in the lab, showed up inconsistently, and did very little lab work over the course of the year.

Program Participation an Important Factor in Hiring Decisions

Most of the NIH mentors indicated that the Scholars' participation in the UGSP was a very important factor in their decisions to take them into their labs for one or more years of payback; they probably would not, or could not, have hired these individuals if they had not been in the program. A significant concern for several of the mentors was the scarcity of FTE slots, because during payback (and summer, for that matter) UGSP Scholars must be given full-time positions as regular employees of the NIH.¹⁶ But individual labs reportedly seldom have extra FTE slots, and if they did, they might be more interested in filling those positions with more advanced candidates such as postdoctoral fellows, than with individuals who have just completed their undergraduate degrees. Two mentors specifically pointed out that if higher officials in their ICs had not “loaned” them FTE positions in support of the UGSP and its goals, the mentors would not have been able to take on Scholars for a payback year.

¹⁵Among these five mentors, three had rated their Scholars, at the start of the summer session, as above average, one rated his Scholar as on a par with, and one rated his Scholar below average, relative to other employees at the same point in their careers.

¹⁶In contrast, Postbaccalaureate or Predoctoral IRTA (Intramural Research Training Award) Fellows do not come into the NIH as regular employees and do not require FTE slots.

Some mentors gave other reasons why they likely would not have taken on the Scholars we asked about if they had not been in the UGSP, including: a general policy of almost never hiring postbaccalaureates; a strong preference for individuals who will commit to staying in the lab for two years or more, whereas many UGSP Scholars want to stay just one year; and those particular Scholars' lower-than-desirable level of knowledge and skills. These mentors apparently were willing to make exceptions at least in part because of personal or institutional support for the program.

Being in the UGSP had also helped, according to some mentors, to raise the Scholars' profile relative to numerous strong competitors for limited openings. One mentor, for example, pointed out that employment at the NIH in previous summer sessions, especially in the same lab, but even in different labs, can help to make Scholars "a known quantity." (This mentor, in fact, described having a "legacy policy" of taking back people who have served with him previously.) More generally, he noted that having the UGSP label can help applicants stand out, especially with lab openings becoming increasingly competitive. He expected to have 10-15 fully qualified students apply to take the place of one postbaccalaureate who was soon to leave the lab.

Finally, it is important to note that two of the mentors said they indeed would have hired the Scholars we asked about even if they had not been in the UGSP, citing factors such as their very high grades from a prestigious university and strong skills and qualifications.

What were Scholars' views on the timing of payback?

Six of the seven Scholars who had initiated or completed their payback had begun fulfilling their commitments immediately following undergraduate school. They gave a variety of reasons for their timing decisions:

- to take a break from school, to "see what the world's like," or "get out in the working world and make some money"
- because working at the NIH for a year or two and gaining more experience would help them choose which type of postgraduate program to enter
- because a long-term research experience at the NIH would increase their chances of getting into a particular type of postgraduate program
- because, having "chickened out" at taking the MCAT as an undergraduate, going directly to medical school was not an option

Interestingly, none of the six said they were trying to avoid having payback conflict with possible future plans, and none of them regretted their choice to do payback right away.

The one focus group participant in payback who had deferred that obligation until completing a doctoral-level degree did not cite a rationale for doing so, but said that it was the route officials stressed when she was in the program as an undergraduate. She seemed to

think that officials now are more open to Scholars doing payback right after undergraduate school. Her decision to defer had both minuses and pluses, she said. On the negative side, her interests changed during graduate school and she was no longer as interested in biomedical research as she had been as an undergraduate. On the positive side, she noted that the pay is higher for those who work at the NIH after finishing graduate school.

Five Scholars had completed their undergraduate degrees and decided to defer their full-year service obligations. Of these, three were comfortable with their deferment decisions, seeing their future service as fitting in well with their education and training plans.

- Two planned to complete their postgraduate programs and then return to the NIH. They believed that the NIH could accommodate them whether their interests led them toward clinical or other research, although they thought a fit would be relatively easy for someone with a Ph.D., whereas “for those doing medicine it takes some creativity.”
- The third Scholar planned to fulfill his obligation after two years of medical school before starting clinical work. If his program had not made that possible, he might have done his payback first. Like the two participants cited above, he felt that for people interested in being a clinician only, “it’s kind of hard to fit back in. You can still make it work, but it’s just not as easy as [it would be] if you were just doing bench work.”

Two other Scholars in this group of five payback postponers, however, were less satisfied with their situations.

- The first seemed to think there was no good time to fulfill that commitment. “I think that doing a year at NIH is like taking a year off ... It’s not part of the Ph.D., it’s not part of the M.D., and it’s not part of the residency. It’s just this extra, unrelated thing.”
- The second had committed fairly early to a plan of attending graduate school right after college. Looking back, she now thought it would be less potentially disruptive to do payback right after college, and regretted her decision to postpone it. She might have made a different decision if she had understood the pros and cons better and sooner. To help others who may face similar circumstances, she suggested that more information on how payback can fit into Scholars’ lives be conveyed on the program website, in the application and selection process, and through other communications during the year.

Postponing payback runs the risk that Scholars’ career interests will change substantially while pursuing a postgraduate degree, making the experience of returning to the NIH less enjoyable or less useful to them than it might have been if they had completed their year(s) of service after college. This had happened to two of the focus group participants who had deferred their payback obligations. Both said they had lost interest in conducting laboratory-based research. While one still envisioned a career involving science and medicine, the other

was contemplating a very different direction, possibly a management or administrative position. One of them had heard about another Scholar whose interests had shifted dramatically away from research, and who had arranged to do payback in a non-scientific position at the NIH, but she had not considered pursuing such an option for herself; she was not the type of person to get into that type of “politics.” She suggested, however, that if alternatives to doing scientific research do exist, officials should make that more widely known, so that Scholars whose interests change a great deal will not be discouraged by the prospect of doing payback.

What did mentors see as their responsibilities during payback?

Some mentors described their full-year responsibilities as basically similar to those during the summer session—making sure the Scholars had an interesting and worthwhile research project to work on, typically under the direct supervision of another senior staff member of the lab, and being readily available if the Scholars should have any questions or want any advice—but over a longer time period. About half of the mentors, however, mentioned additional or more specific goals for working with the Scholars over a full year, sometimes contrasting the payback experience with the summer session. Their goals included:

- Ensuring that Scholars have added to their credentials when they leave, through abstracts, other publications, and presentations at meetings; also, paying more attention to their professional development, rounding out their skills and experiences so they will do better wherever they go next
- Spending more time working with the Scholars, teaching them more about science and academic medicine
- Giving Scholars more opportunities to do independent projects
- Building their technical and research skills for whatever they do next, although with the presumption that it will involve research
- Enabling them to develop a long-term project
- Seeing to it that the Scholars see all phases of the scientific research experience—coming up with a problem and hypotheses, designing a study, fixing problems as they inevitably arise, doing the experiments, collecting and analyzing data, and reporting to the scientific community—so that they have a good basis and insight for judging career options and making the best decisions for themselves, whether or not their careers turn out to be in biomedical research

How did mentors describe Scholars' relations with themselves and other staff during payback?

As during the summer session, mentors typically relied on other senior lab staff, such as postdoctoral fellows, to provide direct supervision and primary guidance to Scholars during the payback year. This practice had to do not only with the mentors' busy schedules, but also with the fact that almost all of the Scholars we asked about had initiated their payback right after college. Had they done their payback after earning a Ph.D. or M.D., they presumably would have been given greater independence and responsibility in accordance with more advanced training and knowledge. One mentor who described having daily, direct contact with her Scholar during a payback year said that this had become necessary because the postdoc who had been supervising the Scholar during the preceding summer had left the lab.

Overall, the frequency and pattern of mentors' contacts with Scholars in payback was generally similar to the nature of their interactions during summer. Some mentors, for example, described formal weekly lab meetings, supplemented by more frequent brief discussions as needed, whether about a research project or education and career concerns. A few mentors, however, described having more frequent contact with Scholars during the full payback year and getting more involved in direct supervision. With 52 weeks instead of 10, one mentor explained, he was able to get deeper into research issues with his Scholar, and made a point of personally helping her to prepare for lab presentations because he saw discussing one's work in front of others to be a valuable experience. Another mentor described working closely with a Scholar toward the start of the year, with a goal of having the Scholar work much more independently later on—so that a discussion or explanation that took an hour in the beginning of the year might only take 15 minutes by the end.

Most of the mentors recalled providing a fair amount of assistance to their Scholars regarding future education and career plans, discussing such issues on several occasions over the course of the year. They answered Scholars' questions, offered advice on degrees to pursue (such as an M.D. versus an M.D.-Ph.D.), discussed schools, and wrote recommendation letters. The extent and topics of such discussions may be affected by a variety of factors, including: Scholars' interests and initiative in seeking advice; Scholars' career directions (two mentors said they could be of little help to Scholars who were not going to pursue careers in science); and the timing of the Scholar's decision-making process (they might not need certain types of assistance, depending on what steps they had already taken toward a postgraduate program).

Only one mentor mentioned having discussed the issue of payback timing with his Scholar. He suggested that it might be better for the Scholar to do both payback years consecutively due to future uncertainties, but the Scholar decided to postpone the second year of his obligation until after medical school.

One more indicator of the nature of mentors' relationships with Scholars is the extent to which they kept in touch after the Scholars had left the lab. Mentors' responses revealed considerable variability. At one end of the continuum, five mentors said they had little or no subsequent communication with their Scholars. Two of them did not know the Scholars'

current whereabouts. At the other end of the continuum, four mentors described being in fairly regular contact with their former payback Scholars.

What challenges were associated with mentoring UGSP Scholars during payback?

Several of the mentors saw no particular challenges associated with having a UGSP Scholar in their lab for a full year. Indeed, some of the mentors said it is easier and better to have Scholars for full year than for just a 10-week summer session.

The challenges identified by other mentors concerned two main issues, both related to the timing of payback. First, when Scholars begin their payback right after completing their undergraduate degrees, they often must devote considerable time and effort toward applying to graduate or medical school. This process can reportedly distract them from lab research and require them to be out of the lab for extended periods. One mentor estimated that from October through December his Scholar was out on interviews about one-third to one-half of the time he otherwise would have been in the lab. Another mentor estimated that the interview process could easily cause Scholars to be gone from one to two weeks at a time, with total absences reaching perhaps 10 percent of their time over the whole year. Such absences, both mentors pointed out, can make it difficult to fully integrate the Scholars in research projects, allocate tasks, and keep projects on schedule.

Second, a few mentors sometimes found it difficult to provide work that would keep the Scholars challenged and engaged. Scholars who have just left college are, in the words of one mentor, “junior scientists,” whose skills are not fully developed. They sometimes learn on the job and may need a fair amount of coaching and assistance to get up to speed on a project. In light of these necessary investments, one mentor said he prefers that Scholars spend at least two years in the lab. It is not until the second year that they do their best work and get the most out of the experience, he said. Taking on someone with relatively limited lab experience is, in a sense, an “act of charity,” another mentor explained, and raises a question about opportunity costs. Mentors hope the choice will work out well, but if it does not, they may face the realization that the position might have been given to someone with more advanced training.

It seems worth pointing out, however, that both of these challenges almost certainly apply equally to other postbaccalaureate employees; they are not unique to UGSP Scholars.

What did Scholars who had done payback think about this experience?

For most of the focus group participants who had started or completed their payback, the experience had apparently gone well. They felt they had benefited from the time they had spent working at the NIH and had no major complaints about their experiences.

For two Scholars, however, the experience had a negative aspect, even though they did not describe it as all bad.

- One said she “really liked” her mentor, but that her work experience was not very good. She was not able to work on the project she had anticipated. “Instead of doing research this year, I was really a secretary. I pushed a lot of paper around ... I did not have to use my brain very often.” She admitted that she had not done as much as she could have personally to address the situation, but she still thought it would be beneficial for UGSP officials to maintain “more regular contact with our mentors,” to ensure that mentors understand the point of the program, as well as the Scholars’ goals for the year, and that things are working to everyone’s mutual benefit.
- Another said “a bad lab experience at NIH” had redirected his education and career interests away from a particular area. “Payback changed my path. I said, ‘No more [of that],’ and then I got out of research altogether. I just got back into it in a different field...and I actually like research again.”

Beyond their generally positive feelings about the work they were doing and their relations with mentors, a few of the Scholars in payback felt that their overall experience would have been better if the UGSP were more widely recognized and understood. One of them said that staff in some branches she knew of did not really know what Scholars are supposed to do, or about the program in general. “I don’t necessarily want to be viewed as special, but I just want them to know that we actually are supposed to have a project and a purpose ... What I’m asking for is awareness. I think that’s what’s important—just for people to know what this program is about and that we’re not just random people off the street.” As an example of how the UGSP may not be widely understood, two participants mentioned frequently having to correct people who referred to them as IRTAs (Intramural Research Training Award fellows). They did not want to come across “like a snob,” but they did feel like there was an important distinction between the two programs.

What were pre-payback Scholars’ views on this future experience?

Most of those who had a year or more of undergraduate school remaining, or had just graduated but were going to defer their payback, did not have a clear sense of where at the NIH they might work during payback. This is understandable, given the potentially long time before they would return. In many cases, though, their comments conveyed a real sense of optimism about the experience. They saw it as the “next step” on their career paths, even if they did not know exactly where those paths were headed.

Only one of the pre-payback Scholars expressed strongly negative feelings about having to fulfill this obligation. These feelings were tied to a perception of having received little financial benefit from the Scholarship, as well as career interests evolving away from laboratory-based scientific research. This Scholar described NIH employment as a potential “waste of time for me, based on the career track that I’m on now,” adding, “It might be

worth paying my way out of it instead of doing a year.”¹⁷ As the discussion progressed, however, and other participants described what they understood to be diverse and flexible options for NIH employment, this individual expressed more openness toward fulfilling the obligation.

Even if they did not know what lab or field they would work in, some of the pre-payback Scholars had clear ideas about what they wanted to learn and accomplish, and could contrast their idealized experience with aspects of the UGSP summer session. As one Scholar said,

- “I’m really kind of excited ... I want to take classes while I’m here, so I don’t lose my whole thinking capability and fall behind on the current knowledge. ... It will be a lot easier to get stuff done, because we won’t have the obligation of the evening sessions. It’s more of our own schedule, I think. If you are here for a year, I think you will be expected to be more independent than a summer student. I think it will be a lot more productive. We won’t have the time crunches of trying to get six weeks of our stuff presented ... I [also] want to do more writing and hopefully get a publication or two.”

A few of those who have not yet begun payback saw a great deal riding on their choice of a mentor; it was a lesson they had learned from their summer experiences. They saw having good payback mentors as important not only for their happiness during their time working at the NIH, but also for enhancing the value of that work experience as they moved on in their careers, as is clear in the following comments.

- “I expect to have a closer relationship with my mentor ... Right now, matching exactly my interests is not my top priority ... I need someone that believes in me, that will treat me as an equal, and will challenge me... I want someone who is going to be there and make me work. So I’m going for smaller labs. I’m not going for big names, because those guys don’t have time for me.”
- “I’m expecting to have a better mentor. I don’t need someone to walk me through everything, but just have someone that I can talk to about the experiments that can really explain what is going ... It will be a wasted year if I don’t have a good mentor that is going to be there for me.”

Another participant said that to enhance the chances of Scholars finding good matches in payback, it would be good to recruit more women scientists to serve as mentors.

For participants whose scholarships are extended to cover their senior year and who plan to begin their payback right away, choosing a payback mentor could be a bit stressful.

¹⁷Another focus group participant said he had heard of other Scholars contemplating this option. UGSP officials report that in 2004 two Scholars repaid their scholarships, rather than fulfilling their service obligations at the NIH. One of them needed to care for an ill family member; the other had decided to become a minister.

First, they may be asked to identify potential mentors toward the end of the summer following their junior year, quite a long time in advance. Second, they would be making a longer commitment, expecting to remain in the same lab for at least 15 months. One such Scholar thought this was “really tough,” and suggested it would be easier if they were encouraged to start looking toward the beginning of summer to allow sufficient time to consider various options. She also felt it would be tough for potential mentors to determine whether they would want, or be able, to host a Scholar in their lab for 15 months, beginning almost a year in the future.

A final issue that came up concerning future payback had to do with options as to where the Scholars would be allowed to fulfill the obligation. One Scholar, for example, wished that she could do her payback in an extramural lab. A colleague in another focus group also touched on this idea, saying it would be great if they could be credited for working on NIH-funded research conducted elsewhere. “It may even foster better relationships between some of the academic centers and NIH, if you were doing some NIH work,” he said.

How did Scholars view the required program activities?

Focus group comments on program activities during payback generally were negative. All three of the payback Scholars who discussed program activities said they did not have time for all the activities in which officials wanted them to participate. Monthly lunchtime meetings, to hear a guest scientist, for example, were disruptive of their work schedules, two Scholars indicated. In general, “It was just more like an obligation than being part of a program,” said one, and the other added: “Getting together with other Scholars—sometimes that’s just more of a headache.”¹⁸ In addition, one voiced the opinion that for Scholars who postpone payback until completing a doctoral-level degree, attending meetings aimed at their younger colleagues in payback—such as attending a lecture on applying for graduate school—would be a waste of time.

¹⁸While these participants felt more or less compelled to attend the activities, one mentioned that another payback Scholar, who reportedly no longer had a career interest in science, almost never attended the meetings.

CHAPTER VI

ADDITIONAL PERSPECTIVES

Some information collected for this study does not pertain exclusively, or even primarily, to one of the specific program components discussed in the preceding four chapters (application and selection, academic-year advising, the summer session, and payback), yet is very useful for assessing the extent to which the UGSP is operating as intended. Topics include Scholars' perspectives on program communications, the use of participant feedback to improve program operations, Scholars' interests in working at the NIH beyond their time in the program, and Scholars', advisors', and mentors' overall assessments of the UGSP. This chapter addresses these issues.

Scholars' Perspectives on Communication and Feedback

Program Communications and Information Availability

How well program officials communicate with Scholars and provide full, timely information can be an important aspect of program operations. In some of the focus groups, Scholars mentioned that their contacts with program staff had been very good. One said communications with the OLRs were better than with most other programs or offices that undergraduates typically encounter; two recalled getting good help during the application process; and two thought program officials did a very good job of keeping in touch, including sending timely e-mail messages to remind them of upcoming events or deadlines. Without specific prompting, a few Scholars also expressed very favorable opinions of the main OLRs liaison to them and their peers. Two recalled the helpful role he had played in getting financial aid officials at their colleges to deal properly with the scholarship funds. A third said that if she ever has a problem during the year, she could count on him to help resolve it.

A few Scholars mentioned that they would have liked to have had more detailed information about their wage rates for the summer session well before arriving in Bethesda. "When we showed up here for the summer," one Scholar explained, "nobody knew what they were being paid. None of us had a clue." She recalled that program officials had set a firm deadline in winter for the Scholars to submit their curricula vitae to help in determining their wage rates, but she and her peers reportedly did not get that information "until the end of June" and even then, "when they told us it was available online, it still wasn't available."

A key information and communication tool is the program website. Some Scholars described how the UGSP website had been helpful to them at various times and in various ways. They mentioned using it, for example, for basic information when they applied to the program, for accessing information on the success and whereabouts of previous participants, and for finding lists of potential NIH mentors. (Some of this information is on a special password-protected portion of the website accessible by Scholars, university academic advisors, and NIH mentors, but not the general public.)

Some participants also raised some concerns about the website. One Scholar said, for example, that information was not updated often enough. Another was bothered because, although she had been in the program for a year and had been telling people at her school about it, they could not see her picture and the name of her university because it was only on the password-protected portion of the site. She suggested that as soon as possible after new awardees are announced, their names and pictures should be posted on the site where everyone can access them, to foster public recognition and marketing.

Scholar Feedback and Program Improvement

The focus group participants, especially those in recent cohorts, seemed pleased with their opportunities to provide both informal and formal feedback about the program, particularly concerning the summer session. “They’re really good about asking for your input,” said one participant. Scholars can talk directly with key program officials before or after evening activities, for example, and are asked to fill out computer-based evaluation forms about every guest speaker. One participant said the program director is the kind of person they could talk to at any time if they had a concern about how things were going, and he would do what he could to help them. Comments by a few members of early cohorts gave the impression that opportunities for feedback have increased over time.

The Scholars also seemed pleased with reactions to their suggestions. “People were very responsive to us,” said one Scholar. “They’re really good at adjusting,” said another. A participant funded for two years recalled positive changes between the two summers in response to Scholar feedback. The summer session is better now than during the earliest years, another Scholar said, adding that the changes were in part a result of program officials asking for feedback and then acting on it.

How do Scholars view the possibility of working at the NIH after completing their education, training, and payback?

Because a fundamental goal of the UGSP is to interest students in pursuing research careers at the NIH, we asked focus group participants about their interest in working at the NIH. Their responses revealed a variety of perspectives. A main finding was that relatively few Scholars had firm career plans or definite intentions regarding eventual employment at the NIH. This is not surprising, given that nearly all the focus group participants were still undergraduates or relatively early in their postgraduate programs. For many, anticipating lengthy postgraduate programs followed by residencies and/or postdoctoral fellowships, the start of their careers seemed a long way in the future.

While none of the Scholars said they definitely intended to pursue permanent employment at the NIH, a few were fairly enthusiastic about the possibility.

- One Scholar said she “would love working at NIH” in large part because “they have money to do research and you do not have ask and wait for grants. I think that is amazing. I can see myself in 10 years working in the clinics. I would have patients and not have to ask for the money.”
- Another said, “It would be great. I can see myself here. I really love it.” She cited several attractive features, including opportunities to learn, seminars to attend, the great location, not having to worry about writing grants, the presence of many international people, and the many collaborations that go on.
- A third Scholar said the program had done a good job in making the NIH seem like an interesting place to work by exposing them to “amazing people like Francis Collins” [Director of the National Human Genome Research Institute] and enabling them to interact with the scientists.

Several others said they had not eliminated the possibility of working at the NIH or were keeping that option open. “If the situation is right, and if I’m still truly interested in this kind of work,” one Scholar explained, “then I would come back.” Many of these participants felt they would need to settle on a career choice before they could contemplate any particular employer.

A few other Scholars, while not totally closing off the option, seemed to be strongly leaning away from the NIH. The reasons they cited included: a lack of interest in doing lab-based research; a preference for living in another part of the country, closer to their families; a belief that other employers would pay substantially more than the NIH for new Ph.D. holders taking biomedical research positions; and concern that employment at the NIH would not allow one sufficient freedom to be involved in the community—mentoring local students, for example.

Only three Scholars firmly ruled out eventual employment at the NIH, and for all of them the key issue was location. One preferred a more rural environment, one preferred a place with milder winters, and one preferred to settle either in the state where she grew up or the state of her undergraduate institution, both far from Maryland.

In one focus group, a participant guessed that Scholars in recent cohorts were more likely than those from earlier cohorts to see themselves working at the NIH in the future. A fellow participant agreed and hypothesized this was attributable to officials being more careful to select students likely to pursue careers in scientific research. This perception, however, might also have something to do with the Scholars’ ages. Those from earlier cohorts are several years older than those in more recent cohorts. Younger Scholars may be more open to working at the NIH just as they are more open to many possibilities, whereas Scholars farther along in their education and training have solidified and narrowed their

interests and can say with more certainty whether or not employment at the NIH seems desirable.

Do Scholars see the NIH as a comfortable, welcoming place to work?

In two of the focus groups we directly raised this issue because (1) racial/ethnic minorities make up a large percentage of all UGSP Scholars, (2) some NIH mentors saw increasing diversity at the NIH as an important program objective, and (3) some participants had, without prompting, mentioned concerns about finding mentors and academic advisors who could serve as role models, as well as hearing from more minority speakers during the summer program. Those who addressed the issue generally felt the NIH was fairly comfortable, although they noted some unevenness in minority representation and felt improvements were desirable.

- One Hispanic Scholar said she sees “a very diverse environment” at the NIH, especially compared with her home state. “I come here and I see many different colors and people do not stare at me. I hear so many different accents. I like it because of that ... I was very self-conscious when I came here—the way I speak and my accent. I thought people would not understand me and then I had some talks with people that *I* cannot understand.” She also described the NIH as “a very good place for females to work, because of the benefits.” She thought support for women was reflected in the fact that a lactation room had been provided in at least one of the buildings, although she felt its size and environment should be improved. She concluded by saying, “It’s good for women and minorities, although there are not that many Latinos.”
- A black Scholar commented, “NIH is a very great institution and there are a lot of [postdoctoral] fellows who are minorities, but at the higher level positions, such as PIs and lab chiefs, there are only [by his estimation] 12 to 17 minorities out of 3,000. You don’t see that many [minorities]. I don’t think that they’re encouraging [minorities] to be at the scientist level.” He felt that this needs to be improved. “I think NIH needs to reflect the whole population. And here at NIH, we don’t do that. I think NIH can promote itself and reach more minorities.”
- A female Scholar felt that women also constitute a very low percentage of NIH researchers.
- Another black Scholar said that whether minorities feel welcome “depends on where you are.” An observation by both of the Hispanic Scholars cited above is pertinent; they had noticed that minorities at the NIH sometimes group together in certain labs, by nationality—“the Japanese lab, the Spanish lab, the Korean lab,” and so on, they said.

Academic Advisors' and NIH Mentors' Final Comments on the Program

Most of the academic advisors we interviewed were happy with the UGSP, seeing it as a good developmental opportunity for the participants. When asked if they had any suggestions for how to improve the program, a majority said no. Four, however, commented on the potential benefits of increased communication between the program and academic advisors or other officials at Scholars' universities. They thought more information and closer relationships with the program would either help them understand their role in the program, such as the connection between the summer and subsequent academic years, or help to recruit potential applicants. Two of them suggested inviting designated liaisons at various colleges to come to the NIH once in a while to keep them fully updated about the program.

Virtually all the mentors saw the program as helping to accomplish an important organizational objective of the NIH: training the next generation of scientists and expanding and diversifying the talent pool of future biomedical researchers, whether or not they end up working at the NIH. A few also commented that having UGSP Scholars in their labs was useful for conducting specific research projects, or helped keep senior staff members' teaching and mentoring skills sharp. Finally, some mentors took the opportunity of our interview to note that the program seemed to be well run.

How did Scholars assess their overall experiences in the UGSP?

Asked to give their overall views of the program, several Scholars offered very strong endorsements. They greatly appreciated their experiences at the NIH and cited numerous benefits they had derived from their participation, including diverse opportunities they would not have had otherwise, better peer networks, exposure to top scientists, increased self-confidence, an edge in future academic work, and personal and professional growth.

- “I’m very appreciative of this program because without it I would not have been able to go to school. And learning from all the speakers that we have had, I have been able to develop what I want to do in the future. I speak to one person who does this and another who does that, and I think about how to bridge those two. The fact that there is so much collaboration here has opened my eyes and my mind to the opportunities. It has really helped me develop professionally.”
- “I came [here] less confident about my abilities, my future, my opportunities, and what I can do... [Now] I feel much more confident seeing the other Scholars get into excellent schools and programs. It makes me believe that I can do the same.”
- “I think it has been a really rewarding experience because it has shown me that you can struggle and survive. You will encounter these problems over and over again. Nothing is going to be perfect in the future and I know that I can cope

with it and go on because that is what I experienced in this program. It has helped me grow up.”

- “I have had a really good experience in the program... I really wish I had been able to do it earlier in my career, because I feel like it really gives me an edge in science and understanding the methods and critical information and everything. It really can make you a well-rounded student and future researcher. Just being here with some of the top researchers in the field, and learning so much so quickly, and being in an environment that really fosters learning, it’s just been really incomparable.”
- “The program has been really, really, such a great help to me, not only in terms of research experience, but in terms of confidence. I go back to my school and I’ve already seen a part of the coursework from [my time] here, so I have an edge, academically, over my peers at school. Also, you make great friends here and you network with people, so you definitely build bridges.”

A few noted that their comments pointing out problems and negative experiences should be considered in light of their strong overall appreciation of the program. “Even though we sat here and complained,” one said, “I don’t want you to get the wrong idea.” A colleague continued this thought: “That’s us trying to make it better. Because if I didn’t care, I would have sat here and not said anything. We care and want to make things better for other people who come along after us, so they won’t encounter the same problems that we might have. I liked UGSP a lot and I really want to see it be great.”

CHAPTER VII

CONCLUSIONS

This report provides a unique opportunity for NIH officials to assess where the UGSP has been, where it is now, and where it is going. The views and experiences described by the stakeholders we spoke with do not necessarily represent those of all members of their respective groups—a caution worth bearing in mind—but this report presents a broader and deeper perspective on the UGSP than has been available up to now. It highlights a range of perspectives on the UGSP from some of the people most familiar with it in recent years. While program officials have modified the program slightly over the years, based on their own impressions and Scholar feedback, this report may foster new thinking—or confirm past thinking—about how best to ensure the program is operating in a way that maximizes its achievement of its ultimate objective, which is to interest and support students from disadvantaged backgrounds in pursuing careers in biomedical and other health-related research at the NIH.

In this final chapter, we begin by giving an overall assessment of the extent to which the program is operating as intended, considering all the information presented in preceding chapters. Then we discuss some options to address specific issues that emerged from the study, which could help to improve the program.

OVERALL ASSESSMENT

Overall, the UGSP appears to be operating as intended. It generally seems to be meeting its main operational objectives. In Scholar selection, the program seems to be attracting bright applicants with strong interests in biomedical research. For Scholars who do not already have a faculty member they can turn to for advice and assistance, the requirement to name an academic advisor at their college creates the opportunity for them to develop such a relationship, although it provides no guarantee that this will happen. And some mentors' statements that they might or probably would not have hired some Scholars if they had not been UGSP participants provides evidence that the program gives some Scholars research and developmental opportunities they might not otherwise receive.

The UGSP also appears to be operating *well*. Program administration seems generally smooth. For example, there appeared to be good communication lines between program

officials and Scholars. We have not detected any large or systemic problems with the operation of the program that would threaten its ability to continue operating smoothly.

Finally, the Scholars, who are the most important stakeholders, generally felt quite positive about the UGSP and the opportunities and experiences it had provided. Those whose participation would continue or resume identified various ways they had benefited from their participation. They were grateful for in the future, via additional summer sessions and/or in payback years, generally were looking forward to it.

The UGSP is not problem-free, of course, but probably no program is. We have reported a wide variety of complaints or critiques from various stakeholders in the belief that candid comments, whether pertaining to relatively narrow issues or broader dimensions of the program, will be valuable to UGSP officials in considering the overall state of the program. However, in our view, positive comments outweighed negative ones both in number and in significance. In addition, to help keep things in perspective, a point made in the preceding chapter bears repeating: The Scholars we interviewed generally intended their criticisms to be constructive, to help improve a program they already rated pretty highly.

OPTIONS FOR PROGRAM IMPROVEMENT

Below, we highlight a few options that may help to improve the UGSP by addressing some issues that emerged from the interviews and focus groups. The issues touch on all the basic program components: application and selection of Scholars, academic-year advisement, and the summer and full-year NIH work obligations. Due to the nature and scope of our research, we cannot be certain whether the issues identified are extensive or serious enough to merit action by program officials. In some cases, officials may want to consider gathering more extensive information about an issue; in other cases, they may have enough knowledge, based on their experience with the program, to decide what, if anything, should be done. We have mainly emphasized relatively simple actions, but have also included a couple of suggestions that would likely require legislative changes.

Option 1: Increase the Priority Placed on Awarding Initial Scholarships to College Juniors or Sophomores

Increasing the priority on applicants entering their junior or sophomore year of college, as opposed to those entering their senior year, could have a variety of positive effects on the participants and the program.

- Spending at least one summer at the NIH before applying to graduate or medical school could make Scholars stronger candidates for those postgraduate programs.
- Hearing from their peers, Scholars in payback, program officials, and other NIH staff during summer could help Scholars make more fully considered decisions about the timing of their payback. Such information would be especially valuable before they begin their senior year.

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- Because students initially funded as seniors do not return to their colleges after the summer session, they probably have limited effectiveness in enticing other students there to apply to the UGSP. The potential funding may not be a strong incentive for many students this program would like to attract, but Scholars can tell peers about the scholarship and firsthand accounts of the summer session may make the program sound considerably more appealing.
 - With the option to renew their awards, younger students could be involved with the program longer than those initially funded as seniors. Greater exposure to the NIH could not only provide greater benefits to Scholars (a stronger curriculum vita, a more extensive network of like-minded peers), but also could increase the chances that (1) Scholars may factor the NIH into their long-term career plans, and (2) their academic advisors will visit the program, which could help build connections between the UGSP and college faculty (an issue discussed separately, below).

Such a policy could, on the other hand, have some drawbacks. First, in general, the younger students are when selected for the program, the less likely they are to have academic and research experiences that will enable them to function at a high level in NIH research labs, especially during their first summer session. Second, younger students are probably less likely than their older peers, on average, to have firm ideas about their postgraduate school and career interests. If those interests evolve away from biomedical research, the students may be less happy about and less productive in their full-year service obligations, and perhaps less likely than older first-time awardees to progress toward a possible research career at the NIH. Third, it would increase program costs.

Option 2: Strengthen Connections to Academic Advisors

Most of the advisors we interviewed reported little or no contact with UGSP officials and some did not have a very clear understanding of their role in the program. A substantial majority of academic advisors do not visit the NIH during the summer session. Some Scholars thought advisors did not perform an important function with regard to the program. If academic advisors understood more about the program and gained a greater appreciation for it, some of them might form closer relationships with their Scholars and could become better sources for referrals of future applicants.

It may take a concerted effort to capture, and keep, academic advisors' attention and interest. Following are some of the communication measures that might help to strengthen ties to academic advisors and their institutions: communicate directly with advisors, as opposed to funneling information through Scholars; notify advisors sufficiently far in advance about the target dates for a summer visit to maximize the chances they will be free to attend; give them a clear sense of how much the program would value their presence during the summer session; use repeated contacts to help ensure that the message sinks in; if they cannot visit on Poster Day, invite them to visit at any other convenient time during the summer session (under the assumption that a visit at some time is better than no visit at all); make sure all Scholars are fully aware of the option to invite an alternate if their official

academic advisor cannot attend (under the assumption that a visit by some faculty member is better than no visit at all); after visits, seek feedback on how advisors enjoyed the experience and how to make it better; and maintain contact with advisors after their Scholars graduate.

Efforts to build and maintain closer ties with Scholars' academic advisors may not be met with much enthusiasm by some advisors, such as those who do not have close relationships with their Scholars in the first place, are simply too busy with other obligations to devote any extra time or energy to this program, or feel that the program should direct its communication efforts to other college officials, such as a pre-med advisement program or the office of financial aid. However, we see no obvious drawbacks to a plan for strengthening connections between the UGSP and college-based academic advisors other than increased economic costs associated with more visits to the NIH and the opportunity costs associated with having program staff work on this issue as opposed to others.

Option 3: Continue Efforts to See that Scholars Have Positive Experiences Working in NIH Labs

Although most of the focus group participants were pleased with the time they had spent doing research in NIH laboratories, some felt that the experience could have been better. Two themes emerged regarding both the summer and payback components: some Scholars did not have work assignments that fully engaged them, and some were disappointed not to have had more direct contact with their mentors.

We recognize that UGSP officials take several steps to help Scholars have good lab experiences, and that officials may not be able to affect some aspects of Scholars' experiences. For example, they cannot change mentors' schedules to enable them to spend more time working directly with Scholars. However, since summer and full-year lab assignments are the central experiences of the program and may have a direct bearing on Scholars' future interest in working at the NIH, it may be worthwhile to examine and possibly increase efforts toward making Scholars' work experiences more positive.

Following are steps to consider: tell Scholars what kinds of questions to ask when exploring placement options, especially for their first summer session; encourage Scholars to stretch themselves and seek out challenging assignments; describe the typical range of Scholar-mentor interactions, to help Scholars form realistic expectations; explain the program to all key lab staff who will oversee Scholars (not just mentors) to ensure that they understand its purpose and operations; provide lab staff with information on the abilities and goals of the Scholars with which they will be working to increase the chances of them arranging for appropriate responsibilities; suggest ways for Scholars to deal with any problems, including when they should seek help from program officials; and check in with both Scholars and mentors soon after new lab assignments (perhaps within a couple weeks in summer or two months in the case of new payback assignments) to see if things are going well.

Option 4: Try to Change Scholars' Perceptions of the Full-Year Service Commitment

Some Scholars viewed the requirement to work one full year at the NIH for each year of funding as out of proportion with the financial benefit of the scholarship, and questioned the equity of imposing the same postgraduate work obligation on all participants when scholarship amounts varied.

One strategy for changing this perception is to change how the component is described. Program officials, NIH mentors, and Scholars all commonly refer to the time spent working at the NIH as “payback.” While payback does not appear to be used on the main portion of the UGSP website, it is used on the password-protected section of the site: the postbaccalaureate service obligation is referred to as the “payback program.”¹⁹ The term payback seems to connote a financial debt to be repaid, but Scholars are not repaying the NIH for their Scholarships; in fact, they receive a salary while working at the NIH. Moreover, so long as Scholars receive widely differing financial benefits, they—and others, including potential applicants—may question why all Scholars would owe the same debt. Full-year employment at the NIH also is typically referred to as an “obligation.” But while officials understandably want to make clear that full-year employment is a legal obligation that all Scholars are expected to fulfill, it should be possible to portray it more consistently as an *opportunity*.

The goal would be to make full-year employment sound more like a special benefit of being in the UGSP and less like a tradeoff for accepting financial support. The message would shift from, “First we pay you, then you have to come work for us,” to, “Not only do we pay for your schooling, but we also guarantee you a paid research position at the NIH,” while stressing how difficult it is for people not in the UGSP to obtain such positions. Relative to the initial financial benefits, program materials and officials could place more emphasis on the subsequent experiential benefits, such as special professional development activities and direct exposure to scientists at the top of their fields. Scholars employed at the NIH could be described as “in the training phase,” for example, rather than “in payback.”

We cannot be sure how effective these word changes would be in shaping perceptions, but the approach outlined above may resonate with some Scholars or future applicants, given that several Scholars told us the opportunity to work at the NIH for one or more years was a key factor in attracting them to the program. A different emphasis concerning this program component may lead to some Scholars feeling more positive about the year(s) they will spend working at the NIH.

A second strategy for changing Scholars' perceptions of the full-year service commitment would be to make the size of their awards more equal. Currently, the size of a

¹⁹A quick search of the Internet also found “payback” used in short descriptions of the UGSP posted on some other institutions' websites, including at least five universities.

Scholar's scholarship is limited to the cost of his or her annual undergraduate education and living expenses, up to a maximum of \$20,000. But college costs vary considerably; San Diego State University is substantially less expensive than Harvard, for example. Scholars' financial need and other sources of funding also help determine how large the UGSP award will be. To even out the scholarships among Scholars, the award could be restructured so that anyone who receives less than \$20,000 toward undergraduate studies could reserve the balance for postgraduate studies. This approach, however, might require a legislative change and would increase total program costs.

Option 5: Create More Interest in Deferring the Full-Year Service Commitment

Program officials prefer for Scholars to defer payback until after completing their postgraduate degrees, seeing this path as (1) more beneficial to the Scholars' long-term interests, (2) more beneficial to the labs they work in during payback, and (3) more likely to result in the Scholars' starting their careers at the NIH—and thus more likely to fulfill the UGSP's ultimate objective. Yet while a majority of Scholars who have graduated from college have deferred payback, many focus group participants saw more personal advantages in doing their payback right after college. They thought this choice would provide a needed break before graduate or medical school, help them get into a better postgraduate program, and be potentially less disruptive of their as yet undefined future career and family plans. In addition, some who had deferred this service obligation seemed to think things might have worked out better for them, personally, if they had done payback right away.

Whether Scholars who defer their service commitments are more likely to seek regular employment at the NIH than those who do payback right after college is an empirical question, but one that cannot be answered at this time. The program is too young and too few participants have completed their postgraduate degrees to provide sufficient data on which to compare career outcomes for the two groups. (Even if data were available, distinguishing the impact of payback timing would be difficult because of selection effects. Scholars may do payback at a particular point in part because of their level of interest in starting their careers at the NIH.) In the absence of suitable data, we are left contemplating anecdotal information and the potential pros and cons of different approaches.

If officials believe that the overall benefits of deferred payback will commonly exceed those of immediate payback, especially from the NIH's perspective, they may need to consider ways of making deferred payback sound more appealing to current and future Scholars. First, officials could try to change the messages Scholars receive about payback timing. We came away with the impression that some Scholars hear many messages from their peers and perhaps from their university-based academic advisors in support of doing payback right away, but not many in support of deferring it. Because we doubt that Scholars will be persuaded by the argument that it is better *for the NIH* if they defer their payback, advocates will probably have to focus on the personal benefits of deferment to the Scholars.

When there is a larger pool of Scholars who have completed or are doing payback after earning their postgraduate degrees, UGSP officials should consider asking them to speak to

summer session participants about the advantages they saw in following this path and the benefits they had derived. These Scholars might be able to convey positive messages about

- how their concerns about not fitting in at the NIH after graduate or medical school—because of evolving research interests—were baseless, and they were able to find suitable positions and rewarding and challenging work
- the level of independence they enjoy(ed) in their NIH labs
- the extent to which they feel/felt like colleagues of their mentors and other senior lab staff
- the significant contributions they are/were able to make by working at the NIH after earning their postgraduate degrees
- if they plan on leaving or have left the NIH after payback, how their NIH experience would help/had helped them find a good position at another institution

NIH mentors might also be enlisted in this effort, to give their perspectives on some of the themes listed above, particularly how they prefer to work with Scholars who have completed their postgraduate degrees, enabling the mentors to provide them better assignments and more independence.

Second, officials could try to create financial incentives for Scholars to defer their full-year service commitments. One strategy would be to alter Scholars' compensation. Since the NIH salary structure probably cannot be altered to pay UGSP Scholars more than other similarly qualified individuals, the best option might be a signing and/or completion bonus. Scholars who defer payback until after completing their postgraduate degrees could be given a lump sum payment when they begin working at the NIH and/or when they have fulfilled that obligation. These payments would not be available to Scholars who do their payback right after college. The value of the bonus payment(s) could be seen as a contingent part of the scholarship—money the Scholars may be able to collect later, if they choose to defer their full-year service commitments until after completing an approved postgraduate degree program. A second strategy might be to alter an existing loan repayment program or create a new one to benefit UGSP Scholars who defer their payback until after completing their postgraduate programs. Both of these strategies, however, would likely require legislative changes and would increase costs associated with the UGSP.

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APPENDIX A

**COLLEGES AND UNIVERSITIES
ATTENDED BY UGSP SCHOLARS**

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Table A.1: Colleges and Universities Attended by UGSP Scholars

Institution	State	Number of Scholars
Alderson-Broaddus College	WV	1
Brandeis University	MA	1
Brigham Young University	UT	1
Brown University	RI	2
California Institute of Technology	CA	1
Clark Atlanta University	GA	1
Columbia University	NY	2
Cornell University	NY	3
Creighton University	NE	1
Delaware State University	DE	2
Duke University	NC	1
Eastern New Mexico University	NM	1
Florida A&M University	FL	1
Georgetown University	DC	2
Hampton University	VA	1
Harvard University	MA	6
Harvey Mudd College	CA	1
Howard University	DC	2
InterAmerican University	PR	1
Johns Hopkins University	MD	1
Lehman College, CUNY	NY	1
Loyola College of Maryland	MD	1
Massachusetts Institute of Technology	MA	1
Montana State University	MT	1
Montana Tech of the University of Montana	MT	1
North Carolina State University	NC	1
Northeastern University	MA	1
Oberlin College	OH	1
Princeton University	NJ	1
Purdue University	IN	1
San Diego State University	CA	4
San Francisco State University	CA	1
Skidmore College	NY	2
Smith College	MA	1
Spelman College	GA	1
St. Francis College	NY	1

Institution	State	Number of Scholars
Stanford University	CA	4
SUNY at Stony Brook	NY	1
Texas A&M University, Corpus Christi	TX	1
Tougaloo College	MS	1
Tufts University	MA	1
University at Albany, SUNY	NY	1
University of Arizona	AZ	1
University of California, Berkeley	CA	1
University of California, Davis	CA	2
University of California, Irvine	CA	2
University of California, Los Angeles	CA	3
University of Florida	FL	1
University of Illinois at Urbana-Champaign	IL	1
University of Maryland, Baltimore County	MD	2
University of Massachusetts, Amherst	MA	1
University of Massachusetts, Boston	MA	1
University of Massachusetts, Dartmouth	MA	1
University of Michigan	MI	1
University of Montana	MT	1
University of Nevada, Las Vegas	NV	1
University of Notre Dame	IN	1
University of Pennsylvania	PA	1
University of Puerto Rico, Mayaguez	PR	1
University of Puerto Rico, Rio Piedras	PR	1
University of Southwestern Louisiana	LA	1
University of Texas, Austin	TX	3
University of Texas, El Paso	TX	1
University of the Virgin Islands	VI	1
University of Washington	WA	2
University of Wisconsin, Madison	WI	1
West Virginia University	WV	1
Xavier University of Louisiana	LA	4
Yale University	CT	5

Source: UGSP administrative data.