MENTORING:
A Guide for Drug Abuse Researchers

Tips for Mentors and Mentees

**NIDA**
NATIONAL INSTITUTE
ON DRUG ABUSE

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A Guide for Drug Abuse Researchers

TIPS FOR MENTORS AND MENTEES

**U.S. Department of
Health and Human Services**

NATIONAL INSTITUTES OF HEALTH

NIDA **NATIONAL INSTITUTE
ON DRUG ABUSE**

ACKNOWLEDGMENTS

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"NIDA offers a strategic set of funding mechanisms to support the development of research scientists through various stages of their careers. These awards are designed to ensure that scientists of the very highest caliber will be available in adequate numbers and in the appropriate research areas and fields to meet the Nation's drug abuse and addiction needs."

—Nora D. Volkow, M.D., NIDA Director

PREFACE

Quality mentoring, good planning, and hard work, along with a favorable environment, are some of the elements that combine to create a successful career. This guide focuses on the importance of quality mentorship and offers suggestions for creating a successful mentor–mentee relationship. The chapters that follow include information that places mentoring in the broader context of research training, data from surveys with mentees, guidance on good mentoring practices, discussion of some challenges to mentoring, and a listing of mentoring resources that can be accessed via the Internet. "How To" boxes can be found throughout the guide, which provide quick access to ideas and checklists for mentors and mentees.

This guide is intended to enhance the career development of research scientists who wish to study drug abuse, by providing insights for both mentors and mentees. The guide is designed to inform scientists from all of the multiple disciplines that study drug abuse. It focuses on mentoring approaches that are based on practices and recommendations from experienced senior scientists in drug abuse research and also is informed by input from junior researchers. The guide was developed over several years with the help of both mentors and mentees. Work began at a workshop of the College on Problems of Drug Dependence (CPDD) in 2003, continued at a career development seminar of CPDD in 2005, and culminated at the National Institute on Drug Abuse (NIDA) Research Training Institute in 2006.

The guide includes information and resources intended for both mentors and mentees. It is hoped that providing information within a single guide to mentors and mentees about their roles will help each to better understand the expected role of the other. We hope that the guide will serve as a springboard for discussions between mentors and mentees throughout their careers. Terms such as *mentee, trainee, student, fellow,* and *postdoctoral researcher (postdoc)* are used throughout the guide to describe the individuals receiving guidance as they embark on careers as independent scientists.

The demographics of students and mentees are changing continually. As the demographic characteristics of mentees shift, so must the the training of mentors.

PLACING MENTORING IN CONTEXT

Background for Mentors

As senior investigators, mentors influence the culture of the institutions in which they work and the culture of their field as a whole. In order to foster a climate that best supports training of new investigators, mentors must be aware of issues and trends in their field of research. They need to be aware of the challenges and issues associated with recruiting junior investigators, developing family-friendly policies, meeting demands for multidisciplinary science, and understanding changes in funding opportunities for new investigators. This chapter presents information on some of these topics. Awareness of these background factors can help mentors create a climate that fosters the most optimal training experience for junior investigators.

Demographic Trends Related to Research Trainees

The demographics of students and mentees are changing continually. Data from the National Postsecondary Student Aid Study (NPSAS), published in 2007 (*http://nces.ed.gov/pubs2007/minoritytrends/index.asp*), indicate that 11 percent of the U.S. population were enrolled in graduate programs, while in 2004 it had increased to 25 percent. Much of this increase was attributed to enrollments after 1990. Graduate enrollment by Hispanic students increased by 377 percent during these years; enrollment by Asian/Pacific Islander students increased by 373 percent; Black student enrollment increased by 181 percent; American Indian/Alaska Native student enrollment increased by 162 percent; and enrollment by White students increased by 27 percent. More females than males were enrolled in graduate programs in 2004. The time span between receipt of an undergraduate degree and receipt of a doctoral degree increased from 8.7 years in 1980 to 10 years in 2003. The NPSAS data also indicate that the average age of graduate students in 2004 was 33, and 23 percent were older than 40 years.

As the demographic characteristics of mentees shift, so must the training role of mentors. Shifts in the age of mentees suggest that mentors must create challenging learning environments to meet the various learning styles of adult students and to build upon the mentees' prior research and work-related experi-

ences. As the racial and ethnic composition of trainees is becoming more diverse, mentors must ensure that they are responding to the unique experiences of minority students as they work with them toward achieving independence.

Specific to drug abuse research, it has been estimated that a substantial number of drug abuse researchers will retire in the next decade. A conference was held in May 2006, titled "Reflections on 40 Years of Substance Abuse Research," at which it was estimated that approximately one-third of investigators will retire in the near future, and that this percentage may be an underestimate for physician investigators. Thus, it is more critical than ever to recruit more scientists to the area of drug abuse research and to mentor them well.

The Need for Multidisciplinary Training

Drug abuse research, as well as other health science research, is becoming increasingly complex and multidisciplinary in nature. Approaches from single disciplines have done much to advance the science, but technological, methodological, and other

advances have established the need for increasingly multidisciplinary approaches to address more complex questions. Multidisciplinary training is more essential than ever for the development of junior investigators. In response to this, mentors must be willing to adopt a new mentoring strategy that involves working with those outside of their field and appreciating other scientific cultures. They must also encourage their mentees to adopt a multidisciplinary perspective when appropriate and support them in developing a multidisciplinary team of mentors. This is especially important as increasing numbers of funding opportunities are developed to support interdisciplinary science. Multidisciplinary training will require a team approach to mentoring, which combines a structured, core didactic component and an apprenticeship-style training component.

Other Trends

A recent survey of 1,300 postdocs at the National Institutes of Health (NIH) indicates that more family-friendly policies are needed at U.S. research institutions. Family responsibilities appear to influence

the career goals of men and women differently: women who are married with children are less likely to report wanting to be a principal investigator (PI), when compared with men, women who are single, and women who are married without children. Approximately 57 percent of married, childless, female postdocs reported that having a child would influence their career, compared with 29 percent of married, childless male postdocs. The survey suggests that some female mentees might require part-time positions. The report also suggests the importance of providing affordable child care for researchers. The importance of child care is further suggested by the fact that 40 percent of professionals with Ph.D.'s in the life sciences are women, and yet, only 29 percent of tenure track positions are held by women (Bhattacharjee, 2007).

Applying for funding for junior scientists has become increasingly competitive. Even as NIH funds doubled in recent years, the percentage of grants going to new investigators has remained at 6 percent of the total funded R01s. Interestingly, while the number of funded T32s (institutional training grants) and K01s (mentored scientist awards) has increased over the past 4 years, the number of individual postdoctoral grants (F32s) has decreased.

Furthermore, the average age of the recipient of a first award increased by approximately 5 years during the period from 1980 to 2006. Currently, on average, Ph.D. investigators are 42 years of age at the time of their first R01 award, and M.D. investigators are 44 years old. Mentors should be aware of these trends and be prepared to find ways to support their mentees while they are working toward independence.

Mentors and mentees can evaluate trends in postgraduate training and fellowships by visiting the Web site of the NIH Office of Extramural Research (*http://grants.nih.gov*). This site shows both current and long-term trends in awards made by NIH to universities, hospitals, and other research institutions (see *http://report.nih.gov/award/trends/findorg.cfm*). The Web site reports awards by average cost, mechanism, principal investigator, organization, geographic area, and characteristics of the principal investigator. Con-

ducting a search on this site can identify a range of available training opportunities. A unique feature of this Web site for mentees is the link to various reports, PowerPoint presentations, and executive summaries.
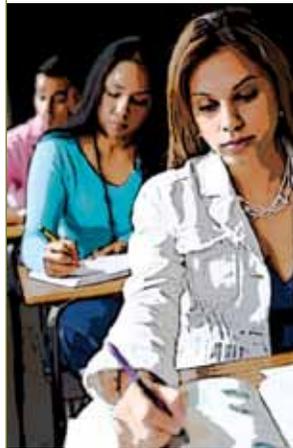
Current Needs for Biomedical and Behavioral Scientists

In 2000, the National Academy of Sciences (NAS) undertook the task of identifying changing needs in the biomedical and behavioral sciences. The Committee on National Needs for Biomedical and Behavioral Scientists was formed at the National Research Council, and from the Institute of Medicine issued the report *Addressing the*

areas that would benefit from an increase in research training were singled out, such as health services research, outcomes research, nursing, dentistry, epidemiology, and biostatistics.

» There should be an increase in interdisciplinary research training programs to enable investigators to respond to future research initiatives.

» Because of the successful career outcomes of National Research Service Award (NRSA) recipients, NRSA training grants and fellowships should be emphasized over graduate research assistantships.

Fellows on NRSA grants, compared with their colleagues without NRSA support, were more likely to be appointed as faculty and more likely to apply for and receive independent NIH support.

Nation's Changing Needs for Biomedical and Behavioral Scientists (2000). The report helped to define current needs and made recommendations for future directions. Specifically, the report stated that—

» Research training and overall Ph.D. production in the behavioral and social sciences should not be increased. However, several

» Despite the persistence of health disparities among underrepresented minority populations, low numbers of Black, Hispanic, and Native American trainees are in the research workforce. Thus, there is a need for both more minority scientists and a greater focus on racial and ethnic disparities in health problems.

The NIH response to the NAS report (*http://grants.nih.gov/training/nas_report/NIHResponse.htm*) is

In response to the NIH initiative to reduce and ultimately eliminate health disparities, NIDA includes

> Although medically underserved minority populations are rapidly increasing, the number of research personnel who seek to address the health problems of these populations is not growing commensurately. NIDA's *Strategic Plan on Reducing Health Disparities* includes a focus on underserved minority populations as well as training in health disparities research.

consistent with several of the NAS report's recommendations, including—

» Universities should give all students adequate training and career development opportunities, faculty should frequently monitor progress, and there should be adequate channels for the resolution of grievances.

» The emphasis on multidisciplinary training should be expanded.

Health Disparities Research Training

NIH also has maintained that training programs should expose participants to issues associated with health disparities, according to the *NIH Strategic Research Plan and Budget to Reduce and Ultimately Eliminate Health Disparities, Fiscal Years 2002–2006* (*www.ncmhd.nih.gov/our_programs/strategic/volumes.asp*).

as part of its strategic plan a goal to advance the understanding of the development and progression of diseases and disabilities, such as drug abuse, addiction, and their consequences, which contribute to health disparities in minority populations. The *NIDA Strategic Plan on Reducing Health Disparities* can be viewed at *www.drugabuse.gov/StrategicPlan/HealthStratPlan.html.*

Conclusion

Awareness of the context of research training within institutions and in the broader field can help mentors provide the best training experience, address the needs of the mentees, and influence the culture of training. This will ensure that training experiences continue to improve over time and that they are suited to the needs of mentees.

NIDA has made a strong commitment to supporting and training future scientists and has a number of programs and initiatives that support both predoctoral and postdoctoral scientists interested in drug abuse research.

FOCUS ON MENTEES

This chapter focuses on the needs of mentees. Information is presented on training opportunities at NIDA, and drawing from multiple surveys, information also is presented on successful training strategies from the mentees' perspective. Because drug abuse is often stigmatized, investigators who study addiction and the public health consequences of addiction report that the field often is similarly stigmatized at academic institutions. The drug abuse research community sometimes faces unique challenges in recruiting and retaining a qualified pool of scientists. NIDA supports a number of programs to help address the training needs of substance abuse researchers.

Training With NIDA

» NIDA has made a strong commitment to supporting and training future scientists.

» NIDA has a number of programs and initiatives that support both predoctoral and postdoctoral scientists interested in drug abuse research. NIDA trainees are invited to attend grant preparation workshops, poster sessions, and/or special sessions at conferences and workshops (e.g., CPDD, American Psychological Association, Society for Prevention Research, Society for Research on Child Development, Society for Neuroscience). Current information on these can be obtained from NIDA program officials or, for some activities, from NIDA's training Web site (*www.drugabuse.gov/ researchtraining/traininghome.html*).

» NIDA supports individual Ruth L. Kirschstein NRSAs for predoctoral students (F31), postdoctoral fellows (F32), and M.D./ Ph.D. candidates (F30), as well as funding for over 50 training sites for predoctoral and postdoctoral trainees across the country (T32). NIDA also funds a variety of mentored career development awards (e.g., K01, K08, K12, K23, K25, and K99). Additional information about these and other programs can be found at NIDA's research training Web site: *www.drugabuse.gov/ researchtraining/traininghome.html.*

To guide applicants, NIDA has developed a research training brochure that carefully describes each training program and includes the type of training provided, career level of training, and application submission

dates. The brochure is available on NIDA's research training Web site (*www.nida.nih.gov/pdf/Research Training/ResearchTrainingBroch.pdf*).

Additional information about training opportunities can be found on the following Web sites:

» Roadmap Initiatives: *www.nihroadmap.nih.gov*

» Enhancing the Postdoctoral Experience for Scientists and Engineers: *www.nap.edu/open-book.php?isbn=0309069963.*

» Research Training (K Kiosk): *www.grants.nih.gov/training/careerdevelopmentawards.htm*

A Successful Research Training Fellowship: The Perspective of Mentees

Several recent surveys have provided data on mentees' perspectives about successful training. In 2004, *Science* Careers (the career component of the journal *Science*) invited 10,000 members of the American Association for the Advancement of Science (AAAS) to complete an online survey of their training experiences. Results from the 932 respondents are described below and indicate several key priorities for effective scientific training. In addition to the key themes and priorities from this survey, comments from mentees are included below.

» Mentoring
  • "A successful mentorship fosters independence, provides a strong foundation in the area of study, and promotes a continuing relationship with the mentor." —*AAAS Mentee*

» A sense of direction and vision
  • "The vision should not be so constraining that it deprives the postdoc of any flexibility." —*AAAS Mentor*

» Ability to obtain funding

» Encouragement/institutional commitment
  • "It is important that the institution set up an office for career development, training, or postdoctoral training." —*AAAS Mentor*

» Networking

In 2003, the scientific research society Sigma Xi launched its survey of postdoctoral fellows to compare experiences at different institutions in the United States. Out of nearly 1,500 administrators from 174

institutions that were invited to participate, 46 institutions responded, including 18 of 20 top-tier employ-

• Mismatch between expectations and outcomes.

Additional Suggestions for Mentors and Mentees

» Subscribe to the NIH Roadmap e-mail list

» Subscribe to *NIDA Notes*

» Download the *ORWH-Supported Career Development and Mentoring Programs* list from the Office on Women's Health at *http://womeninscience.nih. gov/pdf/ORWHCareerDevelopment.pdf.*

» Download *Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty* from the Howard Hughes Medical Institute at *http://www.hhmi.org/resources/ labmanagement/moves.html.*

» Visit the NIDA Networking Project Web site at *http://nnp.drugabuse.gov.*

ers, as well as NIH. Through e-mail, 22,000 postdocs were notified of the survey, and 34 percent participated. (See *http://postdoc.sigmaxi.org* for demographics of the sample.)

Highlights of the survey results (Davis, 2005) include—

» 75 percent of the institutions had an administrative office for training.

» 70 percent of trainees reported being satisfied overall with their current experience. However, trainees report dissatisfaction from

• Low wages and lack of benefits; low salary compared to same-aged non-postdoctoral Ph.D.'s and individuals without doctoral degrees.

• Few available faculty positions: The annual growth rate in the number of postdocs is 2.8 percent; the rate of growth in the number of faculty positions is 0.8 percent.

» 24 percent of trainees did not consider their advisor to be a mentor.

» No training was reported in the following areas by substantial proportions of respondents:

• Research ethics: 31 percent

• Proposal writing: 37 percent

• Teaching skills: 64 percent

• Negotiating skills: 67 percent

• Group/Lab management: 50 percent

In addition, a number of key training program dimensions were assessed in relation to overall level of satisfaction. Postdocs reporting the highest amount of structured oversight and formal training were more likely to be satisfied, to give mentors high ratings, to have low numbers of conflicts, and to publish more papers than postdocs with the least oversight and training. Research plans were also assessed in relation to mentoring expectations: 20 percent of postdocs who had no research plan with their mentor reported that their mentor was not meeting their expectations, compared with 5 percent of postdocs who had such plans.

Results From a Survey of NIDA Trainees

At NIDA's Spring 2006 Research Training Institute, trainees participated in a survey conducted by Dr. Linda Cottler to help determine how to select the best mentor and to be the best mentee. Factors that were reported as important to consider

NIDA Research Trainees: How Can You Find Opportunities?

» Check the Web for opportunities. Search under "fellowship," "postdoc," "research associate," or "faculty appointment."

» Subscribe to listservs (such as those of CPDD, American Public Health Association, APA, etc.) where ads are placed looking for people like you, or get creative and advertise your availability for a position.

» Network at conferences with trainees, young investigators, and established investigators. Bring business cards and hand them out.

» Follow up your conversations with e-mails and telephone calls.

» Offer to visit the institution in which you are interested and to give a talk.

» Search NIH RePORTER (*http://projectreporter.nih.gov/reporter.cfm*) the NIH database of funded grants, for training grants and/or mentors in the scientific and geographic areas you most want to work in. Contact the PI, as well as co-investigators, who can be found by calling the PI's assistant.

» Ask your advisor for new ideas.

» Search NIDA's Web site for information on training sites (*http://www.drugabuse.gov/ResearchTraining/TrainingSites.html*) and ask the training directors for advice.

» Consult with the National Postdoctoral Association for tips (even if you are not a postdoc).

» Post your CV on *Science Careers* at *http://aaas.sciencecareers.org/JobSeekerx*.

» Visit the NIDA Networking Project Web site at *http://nnp.drugabuse.gov*.

when choosing a mentor included the mentor's gender, current training setting, and position. The trainees were also asked to name one aspect of their current mentoring situation that they would want to change and one aspect of their current mentor–mentee relationship that they would not want to change. Finally, they were asked to comment on the role of good mentoring, good planning, and serendipity in their relationships thus far. Many of their responses are used throughout this guide, as they represent important issues for mentors to consider.

The survey of approximately 60 participants (68 percent female; 90 percent from academic settings; 65 percent either predoctoral candidates or postdoctoral fellows; 35 percent mentored scientist awardees) found similar factors to those reported in the previous surveys described:

» Many respondents reported they were completely satisfied with their current mentor (64 percent of women and 54 percent of men).

» A high percentage (79 percent of women; 85 percent of men) of mentees was completely satisfied with their mentor regarding authorship on papers.

» Mentees were less satisfied with the feedback they received and with the help they received in

making decisions about their career paths (completely satisfied: 61 percent of women and of men).

» Less than half of the respondents (46 percent of women and of men) reported being completely satisfied with their mentor in terms of prioritizing time with the mentee.

» Slightly more than half (54 percent of women and of men) reported that they were completely satisfied with their mentor's networking strategies, specifically, introducing them to other colleagues.

» Less than two-thirds were completely satisfied that their åmentor had mentored them in the responsible conduct of science (62 percent of women and of men)

Based on these findings, a number of suggestions are offered in the following section to help identify mentoring opportunities that match a mentee's research aspirations and to foster high-quality research mentoring and training experiences.

Staging Development Plans

Career development should be planned as a series of steps so that each new experience builds on the previous experience in a manner that promotes growth. This is also

Recommendations for Choosing a Mentor

» Study a potential mentor's CV, looking for:

- Current and past grants (Are they funded? What type of funding?)

- Consulting agreements (With whom do they consult? Is their expertise sought?)

- Editorial responsibilities (Will there be opportunities for mentees to review manuscripts? Are they keeping up with the literature? Is their opinion requested by leaders in the field?)

- Collaborators (With whom do they work? Can mentees participate? Is the collaboration interdisciplinary? Do they publish with the collaborators?)

- Board responsibilities (Is he/she a good citizen? Is the mentor connected to others in the field? Can mentees help with any responsibilities? Does the mentor know a lot of people in the field who can be introduced to mentees?)

- Memberships (Is the mentor involved in the field?)

- Published manuscripts (Does the mentor publish? With whom? With mentees? Is he/she keeping up with developments in the field?)

- Publication venues (Where does the mentor publish? Are they reputable journals? Have the papers been influential to the field?)

- Leadership opportunities (Is the mentor involved in strategic planning in their local institution? Is their opinion requested? Do they serve on influential committees?)

» Interview the mentor's other trainees and ask pertinent questions about attention to mentees, respect for mentees, and credit to mentees.

- Does the mentor have national recognition? International recognition?

- Does the mentor give timely feedback to students/mentees?

- Is the mentor senior enough to share data, limelight, and ownership?

- Has the mentor given adequate credit where it is due?

- Does the mentor reserve time for a regular meeting (weekly, monthly)?

- How does the mentor act at meetings? Is bad behavior allowed in the lab? At meetings?

- Are strategies for career development discussed?

- What was the mentor's career path? What worked and what didn't? Who were his/her mentors, and what did he/she learn from each?

- How does the mentor balance work and family?

- What is the publication record of their mentees?

- What is the grant application and success rate of their mentees?

- Are former mentees finding good placements?

» Follow your instincts.

referred to as staging development. A sense of direction or vision was rated as the second most important factor related to success by mentees in the AAAS survey. How appropriate career development plans are staged is an evaluation component for mentored scientist awards and other training mechanisms. Mentees should—

» Take adequate time to plan their research proposals, grant applications, analyses, and collaborations. The aims should be clear, concise, and focused.

» Schedule relevant coursework around training commitments.

» Establish a writing circle in which coworkers and trainees in your cohort can edit each other's papers and give detailed feedback.

» Submit abstracts for conferences along with applications for travel awards and scholarships.

» Turn presentations into publishable papers within 3 months of the conference.

» Make career development a major priority.

» Don't be an "ivory tower" investigator—be involved. Get your hands dirty and feet wet by experimenting with all the steps necessary to run a successful project.

» Interview respondents, enter data, and offer to help supervise personnel.

» Identify when you should begin establishing your own funding source and submit grant applications consistent with this plan.

Mentee Yearly Self-Assessment Checklist

» Did you achieve your goals? If yes, what strategies contributed to your success? If not, why not?

» How much time did you devote to formal commitments like research seminars, career development seminars, teaching, job searches, networking, writing grants, writing papers, and doing research?

» What collaborations have you established?

» Have you participated in any local or national organizations? Local Institutional Review Boards? Task forces?

» In what areas do you need more specialized training?

» Did you turn your oral presentations and posters into papers to submit for publication?

» Did you enjoy what you were doing? Did you enjoy working with your mentor? In his/her lab?

» How many people did your mentor introduce you to at the last conference? Did you follow up with any of them?

» Are you gaining grant writing skills and applying to funding opportunities when appropriate to do so?

Roles of a Mentor

» Teacher and Role Model

» Agent

» Networker

» Counselor

» … and Mentee

FOCUS ON MENTORS: ROLES AND RESPONSIBILITIES

What Is a Mentor?

The purpose of this chapter is to remind mentors about the roles they play while grooming future scientists. Although formal mentor training is highly desirable, not all scientists have the opportunity or resources available to participate in such programs. This chapter is designed to help clarify roles and responsibilities and to suggest activities that will lead to successful attainment of career goals that meet the expectations of the trainee.

As discussed previously, mentoring was listed as the most critical factor in the career success of a trainee. Mentors have many vital roles and responsibilities: they are teachers and role models, agents, networkers, counselors, and last but not least, life-long learners and mentees themselves.

One useful resource for mentoring, *The Mentor's Guide* (Zachary, 2000), describes mentoring as a—

» "Powerful growth experience for both the mentor and the mentee"

» "Process of engagement"

» "Reflective practice that takes preparation and dedication"

In addition, this guide suggests exercises for mentors and mentees to stimulate better mentoring practices. Many roles and responsibilities associated with mentors have been identified in the literature (Armstrong et al., 2002; Ehrich et al., 2004; Jacobi, 1991; Johnson, 2002; Mertz, 2004; NIH, n.d./2004; Raabe and Beehr, 2003; Selwa, 2003; Tobin, 2004). Many have made a distinction between formal and informal mentoring, where the former refers to planned and managed activities with targeted and structured mentoring, and the latter to nonsystematic counsel (Armstrong et al., 2002). Both can facilitate career development, but formal mentoring has been found to be more likely to foster staged development, in which one experience builds on the previous experiences in a series of steps.

The following mentor roles are drawn from the multiple sources listed above and indicate the many roles a mentor can play—specific activities associated with each role are listed below. Not all mentors will play all of these roles. In addition, mentees may have multiple mentors and each mentor may play different roles for the mentee.

Mentors have many vital roles and responsibilities: they are teachers and role models, agents, networkers, counselors, and last but not least, life-long learners and mentees themselves.

Mentor as Teacher and Role Model

» Shows the mentee how to assess journal articles critically, write technical manuscripts, and critique and revise manuscripts.

» Demonstrates how to manage time and how to train and supervise personnel.

» Teaches the science and trains the scientist to be one of the next leaders in the field.

» Teaches how to conceptualize a study; design a study; and collect, analyze, and interpret data.

» Provides regular career development opportunities, such as journal clubs and other forums to facilitate the exchange of ideas.

» Reviews research analyses with the mentee.

» Schedules routine, structured meetings for advising mentees and giving direction about their work and future careers.

» Helps the mentee improve teaching skills.

» Shows the mentee how to plan for and ensure research productivity.

» Helps the mentee plan his/her career.

» Assists the mentee in writing grant applications.

» Encourages strategic thinking.

» Gives timely feedback on the mentee's work.

　• "I value prompt, detailed feedback and suggestions. I'd like more pre-manuscript guidance." —*NIDA Mentee*

» Sets a good example by being a quality citizen in both the academic and community arenas.

» Sets an example of good behavior in lab meetings; puts a stop to bad behavior.

　• "The PI sets the tone in the lab." —*NIDA Mentee*

» Participates in ongoing training in mentoring. (See "Directory of Useful Web Sites" on page 35 for information on available training.)

　• "I wish mentoring training was required." —*NIDA Mentee*

Mentor as Agent

» Supports the mentee in research arenas and provides recommendations for high-profile committees, journal reviews, and grant reviews.

» Removes obstacles whenever possible.

» Allows the mentee to try new endeavors.

» Boosts the mentee's self-confidence by being an advocate and providing encouragement.

» Knows when it is time for the mentee to advance.

» Offers tips on balancing professional and personal life.

» Does not show favoritism.

  • "I feel my research and its importance are overlooked sometimes because I work in a diverse laboratory with a number of projects and others always get the attention." —*NIDA Mentee*

» Facilitates the job hunt by recommending mentees to colleagues.

» Sets expectations for mentee.

» Gives formal performance appraisals.

» Encourages the mentee to ask questions at meetings.

» Expedites resources by using knowledge of systems and bureaucracies in obtaining support.

» Encourages the mentee to present papers and posters as first author.

» Allows the mentee access to data.

» Gives authorship, including first authorship, to the mentee on papers as appropriate.

Mentor as Networker

» Provides opportunities for the mentee to shadow him/her in the lab, at local meetings, and at conferences.

  • "I used to stay right beside my mentor; she would introduce me to everyone she knew. That allowed me to also meet her colleagues' mentees, the people who would be my cohort. Now, we are all friends and colleagues." —*NIDA Mentee*

» Includes the mentee in discussions and meetings with appropriate administrators to facilitate future access. Involves the mentee in research tasks that matter and avoids delegating only undesirable jobs.

» Introduces the mentee to visiting professors and arranges lunches or meetings with them.

» Accelerates access to colleagues and networks to nurture and develop the next generation. Recognizes that exposing mentees to the professional world and increasing their visibility helps them become more recognized.

  • "My mentor is genuinely interested in my academic and professional development and seeks out opportunities to network with people who will help my career advance." —*NIDA Mentee*

» Introduces the mentee to colleagues at conferences and meetings; allows the mentee to sit nearby so that others associate him/her with the mentor.

» With permission of the editor, allows the mentee to review journal manuscripts—not as a draft reviewer, but as the primary reviewer—and makes sure he/she receives credit for the review.

» Establishes connections with other trainees in the institution and other cohorts.

» Facilitates the job hunt by recommending mentees to colleagues and writing strong and detailed letters of recommendation.

Mentor as Counselor

» Acts as a sounding board for the mentee.

   • "I value my mentor's support, responsiveness, and respect." —*NIDA Mentee*

» Shares experiences when relevant.

» Just helps the mentee; does not try to do it all for him/her.

   • "I would like to not have my mentor micromanage my writing—he writes it without me knowing why he changed it." —*NIDA Mentee*

» Listens and gives advice when asked, or when necessary for the good of the mentee.

   • "I think mentoring is a lot like parenting—a good mentor knows the current level

of the mentee and provides the right level of support." —*NIDA Mentee*

» Protects the student from committing major professional mistakes.

» Protects the mentee in situations where his/her best interests are not represented. Protection should first come in the form of preventing potential pitfalls. Some students may require assistance in protecting their time commitments so that they are not overburdened or prioritizing the wrong activities.

Mentor as Mentee

» Becomes a lifelong learner.

» Doesn't let go of his/her own mentors. Meets regularly with his/her former mentors.

» Learns from his/her mentees.

» Attends formal programs sponsored by NIH or other organizations whenever possible to enhance mentoring strategies.

What Is Good Mentoring?

Each of the roles described above is just one component in a process that promotes career development. Overall, the process is based on an apprenticeship model, in which the student/trainee works closely with the teacher to learn the science and art of his/her chosen career. The goal is for the mentee

to eventually become an independent scientist and future leader and mentor in his/her profession.

In practice, mentors carry out their functions on a daily basis through formal and casual mechanisms. Seminars, workshops, scheduled meetings, and other didactic forums are typical, formal mechanisms through which development takes place. Hands-on activities such as writing manuscripts and journal reviews under the tutelage and supervision of one's mentor, or with other senior-level scientists in a team approach, are also important parts of mentoring. Investment in each mentee will vary—for example, editing documents by a mentor can run the spectrum from rewriting to only offering general suggestions. Both quantity and quality of efforts may vary depending on the level of the mentee's experience.

Flexibility in the mentor matching and selection process is a key ingredient in the development of a successful mentoring relationship. This flexibility allows mentors and their mentees to begin work together, yet provides the freedom to find another match if they discover divergent views, personalities, or styles. Successful relationships can be mentee-directed (i.e., when a student gravitates toward a particular professor and then a

mentor–mentee relationship develops) or program-directed (i.e., the result of a structured mentoring program that suggests a mentor for a mentee). A key factor for a successful relationship is the creation of a supportive dynamic where the mentee feels support but knows that a high level of performance is necessary for the relationship to continue. This process includes an obligation to establish and communicate clear and realistic expectations.

The Daloz (1986) model is a validated paradigm for effective mentoring (Bower et al., 1998). According to this model, effective mentoring is both supportive and challenging (Bower et al., 1998, 1999). Mentors express their support by respecting and trusting their mentees and remaining optimistic and hopeful in the face of difficulties. This is particularly important early in an investigator's career when career prospects are uncertain. A mentor who is neither supportive nor challenging can create a barricade to growth, and the mentee may enter an academic "stasis." A mentor who is supportive but not challenging will confirm the status quo for the mentee rather than inspire advancement. A mentor who is challenging but not supportive will cause the mentee to retreat and withdraw. Growth and vision only occur with a mentor who is a combination of both (Bower et al., 1999).

The Four Phases of Mentoring

Zachary's *The Mentor's Guide* (2000) provides exercises to facilitate effective learning relationships. The exercises are suggested for both mentors and mentees, and they cover four phases of a mentoring relationship: preparation, negotiating, enabling, and closing. Others have labeled these phases differently, such as *initiation, cultivation, separation,* and *redefinition* (Barnett, 1995); or *initiation, protégé, breakup,* and *lasting friendship* (Kram, 1983, 1985; Hunt and Michael, 1983).

In the preparation phase, mentors are asked to review a number of skills, from communication to management of conflict, and rate their comfort level with each. One exercise asks mentors to prioritize which of their skills needs to be improved. Strategies for that initial conversation with the mentee are given in *The Mentor's Guide.*

In the negotiating phase, mentors need to be mindful of the issues discussed in the Sigma Xi survey, including the importance of declaring their expectations. Goal setting is imperative. Mentoring contracts are required at the outset and renewed each year between the mentor and mentee to remind each that regularly scheduled meetings are required and to encourage mentees to attend monthly meetings with other trainees as well as others, such as a training director, if required. In this phase, the mentor also is reminded that mentor–mentee discussions are confidential.

During the enabling phase, mentors perform the difficult mentoring work. A learning environment is built on mutual trust and respect. In this phase, the mentor gives feedback and helps solve ethical dilemmas. Boundaries may be crossed, jealousies may arise, and other stressful issues may occur. Suggestions are given on how best to support the mentee during this phase.

The final phase, the closure phase, can be an emotional period: some mentors and mentees have a hard time letting go. The most successful closures occur among mentors who are secure and who have prepared for and negotiated the closure. Whatever the duration of the mentor–mentee relationship, the mentor should anticipate the successful transition of mentorship.

Additional Mentoring Considerations

» Will an in-person interview with a candidate be required? Who will conduct the interview? Is a talk by the mentee required?

» Are trainees allowed to choose their own mentor? Their own research topic?

» Is a cohort of trainees enrolled together?

» What key achievements are expected from mentees:

and papers? Will the mentor perform this training?

» Are trainees requested to work (e.g., interviewing, fidelity checks) each week on a specific

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Why Become a Mentor?

» The field of drug abuse and addiction research needs more investigators.

» Mentoring can extend your contributions to science.

» You can keep your skills up to date as your mentee teaches you new techniques.

» You can strengthen your contacts by meeting colleagues of your mentee.

» Working with someone is more enjoyable than working alone.

» You gain a sense of personal satisfaction and pride.

» Your mentee's success becomes your success.

» You build potential collaborative relationships for the future.

• How many publications are expected to be submitted already? To be submitted in the first year?

• What specialized training do they need to have before joining the lab?

• How much money will be provided to them for expenses and for travel to conferences?

• Are they expected to write grant applications and/or to apply for their own funding?

» Is there an ombudsman who can help settle disputes?

» What resources are available to train mentees on writing grants

funded grant? If so, who will supervise them on those tasks?

» What hours are they expected to work? Are prolonged absences acceptable?

» Will mentees be located near other trainees, or near the project or mentor?

» Are there specific opportunities for female and minority trainees to take advantage of at your institution, such as formal networks or associations?

» If distance is involved, how will this be handled? (See page 29, "Mentoring at a Distance.")

Multidisciplinary training is more essential than ever, and having a mentor whose skills and outlook are complementary is recommended. Mentors should be prepared to support training in additional disciplines, to help find and recruit other mentors if appropriate, and to assist mentees in developing a plan to work with others outside the mentors' own fields.

CHALLENGES OF TRAINING

Multidisciplinary Training

As indicated in the first chapter, science is becoming increasingly multidisciplinary. Thus, mentees may need to receive training in different fields of science to accomplish their goals. Multidisciplinary training is more essential than ever, and having a mentor whose skills and outlook are complementary is recommended. Mentors should consider whether to encourage their mentees to receive training in additional disciplines depending on the individual situation. Additionally, mentors should be prepared to support this training, to help find and recruit other mentors if appropriate, and to assist mentees in developing a plan to work with others outside the mentors' own fields.

Networking Within and Across Disciplines

Many scientists are focused on collaborators in their own division, department, or field. However, networking across divisions, departments, and institutions is an important way to identify potential collaborators who might be willing to share data and other resources (Saha et al., 1999). It is also a way to adopt a more multidisciplinary perspective. Building a professional network is crucial to successful academic careers (Bland and Ruffin, 1990; Bower et al., 1999). A mentor should help mentees build *their own* network of contacts and potential collaborators. Most researchers are willing to talk about their work and exchange ideas with junior colleagues or fellows. For junior faculty or fellows who are new to an institution, several recommendations for networking techniques are provided on the next page. Many organizations also have formal one-on-one mentoring programs and networking events at their meetings.

Mentoring Mosaic

A *mentoring mosaic* is typically constructed such that a mentee works with mentors in separate but complementary ways. Members of the mentoring mosaic may work with the mentee in different roles, such as a "research mentor" and a "career mentor," or they may mentor on different aspects of a research project. There are many reasons to develop a mentoring mosaic: for example, the available mentors may not meet all mentee needs, or either a mentee desires or the science demands a more

Networking Techniques

» Begin with senior colleagues who have a long tenure at the institution. Ask them for names of colleagues who share your interests.

» Invite a potential colleague for coffee or lunch, share your interests, and learn his/hers. Explore fruitful areas for collaboration. Ask for other names of colleagues who might have a substantive or methodological interest related to yours.

» For epidemiologists and health services researchers: In addition to the usual medicine and public health departments, it is common to find like-minded people working in departments of anthropology, medicine, sociology, economics, psychology, political science, and public policy.

» Look beyond your institution. Find out who the experts are in your area of interest and contact them. Take advantage of national meetings to set up lunch or coffee with these individuals.

» Productive fellows rarely work alone. Find ways to broaden your circle. Your fellowship program director should provide you with names of people to contact.

multidisciplinary experience. It is common to find a senior methodological mentor, but one who lacks content knowledge in a chosen field (or vice versa). A primary mentor can help develop this mosaic.

The mentoring mosaic can include multiple senior level mentors or a combination of senior mentors and peer mentors. *Peer mentors* are colleagues at the mentee level or slightly above who provide advice and counsel (Chin et al., 1998). Types of peer mentors include basic peer mentors, facilitator mentors, and peer mentor project managers. A *basic peer mentor* is a self-identified junior faculty member with shared interest; a *facilitator mentor* is a

faculty member with expressed interest and skill in mentoring; and a *peer mentor project manager* is a member of the peer group identified as lead author or manager of an academic project. Data indicate that semistructured, facilitated group mentoring improved writing, satisfaction with accomplishments, and skills needed for success.

Recruitment of Underrepresented Scholars

The drug abuse research community has traditionally placed a high priority on recruiting minority trainees from diverse and uderrepresented backgrounds, including racial and ethnic minorities. This priority has been a part of all facets of the research

mentoring process and is consistent with NIH's commitment to increasing the pool of investigators from underrepresented minority groups in biomedical and behavioral research. Since 1989, NIH has mandated that all training grant proposals include specific plans to recruit and retain underrepresented minorities. In addition, NIH now requires that training directors document recruitment efforts and minority retention data in all progress reports, and that they provide information on both successful and unsuccessful recruitment strategies. The success of efforts to recruit and retain minority trainees is also a factor in the assessment of the quality of the trainee pool and is reflected in the priority score of the application. If minority recruitment plans are judged to be unacceptable, funding can be delayed or withheld.

Even with these guidelines in place, creative efforts are needed for success. *Science* recently reported that NIH is increasing its minority employment efforts after missing its recruitment target (Mervis, 2006). NIH is considering a proposal to double its recruitment of minority candidates seeking doctoral degrees in the biomedical and behavioral sciences over the course of 8 years. Other programs to recruit more minorities have not done well: less than 15 percent of undergraduates in the Minority Access to Research Careers U*STAR program

progressed to Ph.D. studies. Additionally, nearly 40 percent of those funded for the Minority Opportunities in Research (MORE) Program go on to faculty positions rather than to junior investigator positions.

NIDA has a number of programs to support and further mentor underrepresented scholars, including the Summer Research with NIDA Program; the Diversity Supplement Program; the Diversity-promoting Institutions Drug Abuse Research Program (DIDARP) at *http://grants. nih.gov/grants/guide/pa-files/PAR-09-011.html;* and the Recruitment and Training Program offered by NIDA's intramural program. In some cases, these programs will support minority students very early in the development of their science skills (high school) as well as those at the Ph.D. or M.D. level. The Diversity Supplement Program supports individuals underrepresented in science to work on currently funded grants through the diversity supplement program. The DIDARP provides funding to institutions to increase the capac-

ity of identified scholars to conduct drug abuse research, fosters the research career development of racial/ethnic minority and other faculty and staff who are underrepresented in drug abuse research, and enhances the research infrastructure of diversity-promoting institutions. Additional information on these programs can be found at *www. drugabuse.gov/Infofacts/minority.html.*

In addition to NIH's efforts to foster improved mentorship and training for underrepresented researchers, a number of other organizations have created programs to identify new opportunities to recruit minority students for careers in research:

» The **National Name Exchange Program** and the **Western Name Exchange Program** are consortia comprising 29 universities that annually collect and exchange names of talented, underrepresented, racial and ethnic minority students who are in their junior or senior year of undergraduate education. The purpose of the name exchanges is to ensure that participating universities are aware of and recruit talented and qualified minorities from universities across the country. Each consortium site also conducts other activities consistent with national efforts to increase the enrollment of traditionally underrepresented

peoples in graduate education. A good example of collaboration in this arena is the University of Washington's Graduate Opportunities and Minority Achievement Program (GO-MAP), which has maintained and facilitated access to the databases for both of these name exchange programs since the mid-1980s and continues to do so. (Visit *www.grad.washington.edu/nameexch/national.*)

» The **TRIO Ronald E. McNair Postbaccalaureate Achievement Program** encourages low-income, first-generation college students and students underrepresented in graduate education to consider careers in college teaching as well
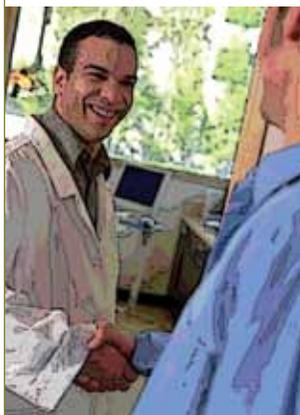
as to prepare for doctoral study. Funded by the U.S. Department of Education, the McNair program provides research opportunities, faculty mentors, support for publishing and presenting research findings, teaching assistantships, and assistance with applications to graduate schools. Each spring, the names, addresses, majors,

and areas of interest for graduate study of seniors who will graduate in December and May are collected from McNair directors nationwide. This information is compiled into a database that is distributed to all graduate school deans in the country for use in recruitment. (Visit *www.ed.gov/ programs/triomcnair/index.html.*)

Other activities for mentors that can increase the diversity of mentees:

» Consider the quality and diversity of the undergraduate population as a potential recruitment pool. Invite students to an open house.

» Use regional and national databases to identify top students who are underrepresented in drug research disciplines. Gather lists of potential mentees who participated in programs such as the McNair Scholars and the Western and National Name Exchange Programs. Obtain lists of potential students interested in relevant programmatic areas and follow up with targeted letters, e-mails, and phone calls.

» Draw on a variety of recruiting mechanisms, including Web sites, targeted mailings, telephone calls, posters, advertisements, and receptions at professional conferences.

» Create a Web site that highlights both mentoring opportunities for trainees and student accomplish-

ments (e.g., publications, awards), as well as provides stories and testimonials about recent experiences. Show the diversity of mentors and mentees on the Web site.

» Advertise programs to targeted populations in colleges and universities that serve a large population of minority and underrepresented students to increase the minority applicant pool.

» Notify undergraduate departments in relevant disciplines, particularly targeting schools with large minority populations. Utilize the Western and National Name Exchange Programs (GO-MAP coordinates the national database) and send direct mailings to historically Black colleges and universities, Hispanic-serving institutions, and tribal colleges.

» Advertise in multicultural journals.

» Ask your own trainees to help in recruiting.

» Lead by example: efforts are aided by having a diverse faculty and training cohort.

Mentees from underrepresented groups need to feel that they are valued members of the research team and not isolated from other research fellows or trainees in their programs. To help build trust, mentees should be encouraged to build mentoring relationships

with other underrepresented investigators at other institutions or departments. Mentors should—

» Encourage mentees to meet others with similar backgrounds.

» Encourage collaboration among other mentees.

» Suggest a group of mentees agree to support each other as peer mentors.

» Suggest internships, awards, seminars, or other programs for underrepresented minorities.

» Be supportive of associations for minority trainees and encourage membership.

» Help build mentee confidence.

» Be accessible.

Mentoring in the Responsible Conduct of Research

Since July 1990, NIH has required that all training grants and mentored scientists' (relevant Ks) proposals include plans for instruction in the responsible conduct of research (RCR). According to the funding announcements, applications must include a description of instruction in scientific integrity. Areas that must be covered include—

» conflict of interest;

» responsible authorship;

» policies for handling misconduct;

» data management;

» data sharing; and

» policies regarding the use of human and animal subjects.

Plans must address the topics, as well as the format of the instruction, participation of faculty, a list of required attendees, and the frequency of the program.

Because NIH encourages collaborating institutions—regardless of their source of support—to provide instruction in RCR to all graduate students, postdocs, and research staff, mentors must make RCR training a priority. Ideas for mentoring include arranging for the mentee to observe or serve on a local human subjects committee, institutional review board, or institutional animal care and use committee; to actively participate in discussions on the ethical conduct of science; and to become involved with institutional RCR activities either on the World Wide Web (see *http://grants.nih.gov/ training/responsibleconduct.htm* for more information) or in person.

It is recommended that this training be ongoing. Ongoing training combined with a substantial plan is the standard expectation of the NIH review committee that reviews these applications for NIDA. Training for

the Health Insurance Portability and Accountability Act of 1996 and previous ethics courses in graduate school are not ongoing and are therefore not applicable. The Office of Research Integrity Newsletter (*http://ori.hhs. gov*) includes information about RCR training, misconduct case reports, articles, new regulations, conferences that specifically address RCR, and other important and timely news. Articles from this quarterly newsletter can be discussed with mentees as well.

Mentoring at a Distance

Sometimes a mentee has no choice but to go outside of his/her institution or geographical area to find an appropriate mentor (Bennis, 1994). If the mentor–mentee relationship is long-distance, the following recommendations are provided for improving the mentoring experience:

» Meet your mentor at national meetings for regular in-person meetings.

» If describing this mentoring in a proposal, write and highlight a persuasive argument to convince reviewers that it can work. Ask your mentor to address this issue specifically in the letter of support that is sent with the grant proposal.

» Discuss distance issues with members of NIDA's Training Committee so that they understand the importance of your requested mentor. (See *www.nida.nih.gov/ ResearchTraining/Contacts.html.*)

» E-mail your mentor at least once per week.

» Plan to visit the mentor for face-to-face meetings and determine how frequent these meetings must be. If describing the plan for meetings in an application, justify the frequency of these meetings. Meet other trainees at the mentor's lab. Communicate with the other trainees often as well, as they will become your cohort. When you are at national meetings, spend time with that cohort of mentees.

» Invite your mentor to your university to give talks and to spend a few days there for mentoring.

» Keep up with journal club readings at your mentor's institution.

» Use Web-based and other technology to stay in touch with your mentor on a regular basis.

Other Resources

Additional Web-based resources:

» *www1.od.nih.gov/oir/ sourcebook/ethic-conduct/ guidelines-mentors.htm*

» *www.training.nih.gov/documents/ postdoc_handbook.pdf.*
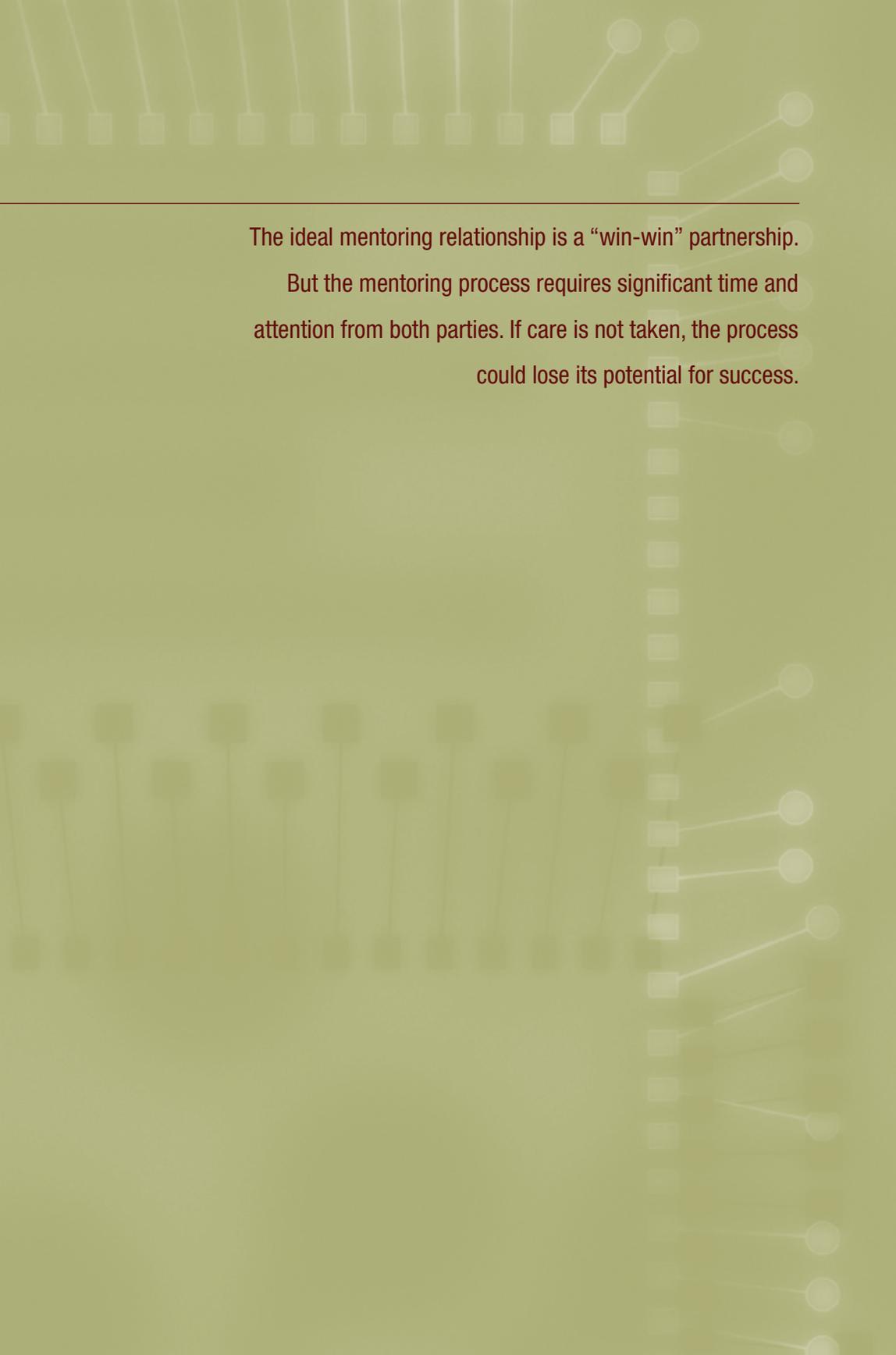
The ideal mentoring relationship is a "win-win" partnership. But the mentoring process requires significant time and attention from both parties. If care is not taken, the process could lose its potential for success.

ADDITIONAL CONSIDERATIONS

Mutual respect, trust, understanding, and empathy characterize an effective mentoring relationship (Rabatin et al., 2004). Good mentors share hard-earned lessons and technical expertise. They listen well but also know when to direct their mentee in more fruitful directions. They make an effort to know, accept, and respect the goals and interests of a mentee. They accept as a goal that the mentee's success is an integral part of their own success. The ideal mentoring relationship is a "win-win" partnership. But the mentoring process requires significant time and attention from both parties. If care is not taken, the process could lose its potential for success. As a result, preventive and corrective actions should be considered to ensure positive outcomes from the research training experience.

Not all mentors or mentoring relationships are ideal. Mentoring relationships are like others: some fail (Markis and Goldstein, 2006). If a mentee or a mentor believes that a mentor–mentee relationship is not going well, he/she should initiate a conversation with the other to discuss ways to improve the relationship. If this does not work to improve the situation, he/she should seek outside counsel, such as from an ombudsman, to develop a solution.

Multiple Mentors

It is rare to find a single mentor who knows everything a mentee might need to learn in order to succeed. Sometimes, the mentee should seek a mentoring team. Mentees may benefit from multiple perspectives on theory, methodology, content, and career development. Multiple mentors might also be necessary to learn multiple career skills. Appropriate members of the team could include local or distance mentors with complementary content, theoretical, or methodological expertise. The mentee's division chief or department chair can be useful to help protect the mentee from burdensome clinical and administrative distractions and to provide counsel regarding career development and promotion within the mentee's field (Gill et al., 2004).

Multiple mentors may guide a mentee through his/her career; however, if one is applying for an individual NRSA application, the identification of one highly competent senior mentor often is preferable. One

mentor must be in charge if there are multiple mentors, and this should be clear in the proposal. One reason for seeking a secondary mentor for an individual NRSA application is to bolster a junior primary mentor. A mentee may need a secondary senior mentor if he/she has a junior mentor who is lacking in publications, research grant funding, and/or experience training at his/her level (e.g., predoctoral or postdoctoral).

Those applying for mentored scientist (K) awards are more likely to list multiple mentors. Questions about mentors should be directed to program officials.

How Can the Mentee Facilitate the Mentoring of the Mentor?

The effective mentee accepts responsibility for his/her own academic career planning (Bower et al., 1999). Early on, the mentee should meet with the mentor to plan three essential aspects of the career plan: (1) management of one's career; (2) identification of the values, norms, and expectations of the division, department, university, and field; and (3) development of a productive network of colleagues and collaborators (Bland et al., 1990).

Career management and planning are individualized tasks that are a function of one's core values, aspirations, talents, and interests. The

mentee must let his/her mentor know of his/her individualized goals and plans. Often, a department contains individuals who have numerous career paths, and a good mentor should help a mentee define his/her own path rather than impose one.

Frequently, it is assumed that everyone knows the *values, norms,* and *expectations* within a department, lab, or field, when, in fact, many mentees are unaware. Professional socialization is an important role for the mentor that is sometimes overlooked. A good mentee should gently cue the mentor or mentoring team to explain the rules and expectations of the department or academic affiliate, and of the field as a whole. As already discussed, some mentor–mentee relationships develop a written mentoring contract that formalizes these expectations. Whether such a contract will be necessary or helpful will depend on the culture of the individuals and institutions involved. Mentoring relationships have been known to fail despite a contract, and others have thrived with only verbal understandings. In any

If Your Mentor Stops Mentoring

What happens when your mentor stops advising? What happens when the mentor-mentee relationship deteriorates?

» Formulate plans for resolving the situation.

» Attempt to resolve and improve the situation with the mentor.

» Know your rights: you don't have to stay with the mentor.

» Don't rely solely on your friends or significant other for advice.

» Consider getting outside counsel: see a career counselor, ombudsman, or associate dean or vice chancellor at your institution.

» Put your dissatisfaction in writing and talk to the PI of the training program, the division head, or your department chair, as appropriate.

case, it is best to start with modest, realistic expectations and allow them to grow with trust and experience.

The Role of Institutions to Foster Quality Mentoring

According to the AAAS survey, institutional commitment was mentioned by 78 percent of the mentees as a factor that correlated with career success. Mentors who work to make their environments better—not only for themselves but also for their mentees—are invaluable. Many institutions have set up competitive supplemental travel funds to help trainees attend scientific meetings. Successful mentoring programs at institutions also host annual conferences for postdocs and trainees to showcase their work to other trainees, faculty, and staff.

NIH does much to foster training opportunities and mentoring. For example, NIDA actively supports travel awards, poster sessions, and fellow-led symposia for research fellows and trainees at professional conferences. The Institute's goal is to promote professional networking between fellows and trainees from different programs and research institutions. By emphasizing the importance of mentoring, NIDA hopes to facilitate high-quality mentoring between senior scientists and their research fellows.

The National Science Foundation (NSF) and NIH also emphasize the importance of mentoring. NSF requires researchers to include a mentoring plan in every grant application. NIH states that PIs can count time they spend mentoring as grant-related, provided the training is related to the research (see *http://grants1.nih.gov/training/q&a.htm#mentor*).

What Can Institutions Do To Promote Mentoring and Track Success?

» Establish a fixed training period for mentors, with goals, milestones, and standard yardsticks.

» Ask mentors to develop mechanisms for formal completion or extension of the training period, and promotion to faculty or research associate appointments.

» Continue to offer research training institutes for faculty and mentees; invite speakers to share their valued practices with the audience.

» Support the training of trainers.

» Establish an award for best mentor of the year or for distinguished mentors.

» Promote NRSA and other fellowship programs.

» Support minority and disparity training.

» Establish an annual review of progress for each trainee; provide feedback to individuals.

» Offer courses and workshops on how to perform the important tasks of research, such as grant writing, lab management, project management, and data presentation.

» Sponsor diversity workshops such as the Women in Science and Engineering Leadership Institute (WISELI).

» Provide the coursework for ongoing RCR training.

» Educate trainees about research employment.

» Make sure trainees know about the process for reporting grievances (e.g., ombudsman).

» Establish a local trainee society—include mentored scientist (K) awardees or early career faculty as well.

» Track grants submitted, papers published, major events, and contributions of each mentee.

» Ask mentees to give a performance appraisal of their mentor.

» Encourage mentors from different fields; post names of faculty interested in mentoring, along with their areas of interest, on a central research Web site.

» Educate mentoring faculty on research and grant productivity and markers of mentee success.

» Monitor faculty for mentoring abuse—use this as an evaluation criterion.

» Hold frequent workshops that teach mentoring skills.

» Reward mentors for good teaching and mentoring.

Conclusion

Mentoring junior scientists is one of the most important responsibilities of senior scientists. Mentors, as well as the institutions for which they work, must continually evaluate their training and mentoring programs to ensure the success of their research programs and the success of the next generation of scientists. Striving to improve mentoring ensures that the next generation of scientists will be well trained and positioned to continue advances in science and in public health.

Directory of Useful Web Sites

» Scientific Directors Policy Updates for Mentors and Trainees—May 1, 2002
http://www1.od.nih.gov/oir/sourcebook/ethic-conduct/sdpolicy-mentoring.htm

» Guidelines for Mentors at the National Institutes of Health
http://www1.od.nih.gov/oir/sourcebook/ethic-conduct/guidelines-mentors.htm

» Guidelines for Annual Review of Trainees
http://www1.od.nih.gov/oir/sourcebook/ethic-conduct/guidelines-evaluation.htm

» Guidelines for Trainees at the National Institutes of Health
http://www1.od.nih.gov/oir/sourcebook/ethic-conduct/guidelines-trainees.htm

» "A Guide to the Handling of Scientific Misconduct Allegations in the Intramural Research Program at the NIH"
http://www1.od.nih.gov/oir/sourcebook/ResEthicsCases/sm-booklet.htm

» NIH Handbook for Postdoctoral Fellows (Office of Education, Office of the Director, NIH)
http://www.training.nih.gov/handbook

» "Quick Guide for Grant Applications"
http://deainfo.nci.nih.gov/extra/extdocs/gntapp.htm

» "Advisor, Teacher, Role Model, Friend: On Being a Mentor to Students in Science and Engineering," National Academy of Sciences
http://www.nap.edu/openbook.php?record_id=5789

» NIDA Predoctoral Research Training FAQs
http://www.nida.nih.gov/ResearchTraining/Predocfaqs.html

» NIDA Postdoctoral Research Training FAQs
http://www.nida.nih.gov/ResearchTraining/Postdocfaqs.html

» NIDA Networking Project
http://nnp.drugabuse.gov

» NIDA's Opportunities for Special Populations
http://www.drugabuse.gov/Infofacts/minority.html

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