



Psychiatric Research Report

The IOM Report

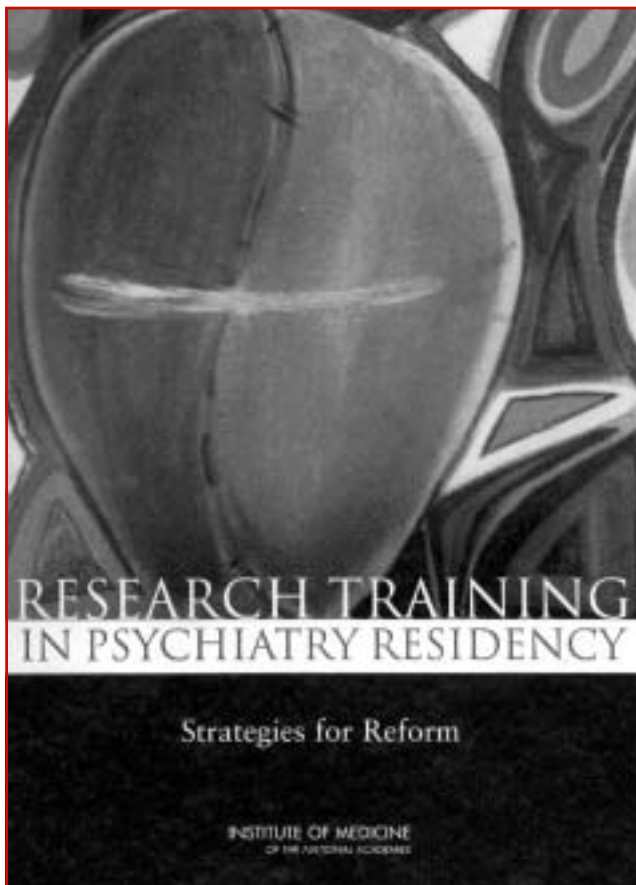
In this issue

For the Fall 2003 issue of the *Psychiatric Research Report (PRR)* we depart from our standard format of reports, articles, and columns in order to focus on three projects that relate to the training of psychiatric researchers.

Over the course of the past year, the *PRR* has featured two series of articles related to the preparation of psychiatry residents for research careers: a four-part series on “Model Research Training Programs” and a three-part series on “Writing a K Award – a NIMH Mentored Career Development Award.” In response to the number of reprint requests we have received for articles contained in these two series, we have chosen to publish a compilation of these articles as they appeared in individual issues of the *PRR* from Summer 2002 through Summer 2003.

The K Award series was written by Melissa DelBello, M.D., who began her contributions to the *PRR* as a resident and as author of the column “Residents’ & Fellows’ Corner.” Upon assuming a role as assistant professor, Dr. DelBello initiated a new column for the *PRR*, “Building Research Careers.” The K Award series spans both columns and can be found in this issue on pages 4 - 9.

The series on Model Research Training Programs was a recapitulation of four presentations delivered to the NIMH-APA Workshop on Research Training in Residency, held November 7, 2001 on the NIH campus in Bethesda, MD. At the Workshop, Drs. John Greden, David Kupfer, Ronald Rieder, and George Heninger



described the unique features of research training programs at University of Michigan, University of Pittsburgh, Columbia University, and Yale University, respectively. The four *PRR* articles based on these presentations are also reproduced in this issue on pages 10 - 22.

Looking back

The 2001 NIMH-APA Workshop was convened in response to official concerns about a decline in the number of psychiatrists pursuing research – especially patient-oriented research – at a time when research opportunities for those medically and clinically trained to deal with mental disorders would seem never to have been more enticing. The fields of behavioral and basic brain research were experiencing unparalleled levels of funding, media attention, and scientific acknowledgement, perhaps reflecting a growing social acceptance and destigmatization of mental illnesses. Public perceptions of mental disorders seemed to be moving progressively closer

to those of general medical illnesses, with a national audience awaiting the next image of an active brain, an aging brain, or a brain on drugs of abuse, and with providers and patients alike eagerly anticipating the next research breakthrough in psychopharmacology, gene identification, early diagnosis, or in prevention strategies. Yet, at the same time, available data indicated decreases in the number of medical students choosing psychiatry residencies, the number of psychiatry residents electing research paths, and in the number of psychiatrists awarded NIH research grants.

The NIMH-APA Workshop at the end of 2001 posed this dilemma to approximately 60 representatives of academic and government research programs. The Workshop provided a forum in which to explore the problem, frame the relevant questions, and define the parameters for an Institute of Medicine (IOM) study on residency research training that had been commissioned by the NIMH.

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The IOM Initiative

In response to the NIMH request, the IOM Board on Neuroscience and Behavioral Health formed the *Committee on Incorporating Research into Psychiatry Residency Training* to conduct a comprehensive study of research training in psychiatry residency. The 12-members of the broadly representative Committee “were chosen for their special competencies and with regard for appropriate balance.” The members represented adult as well as child and adolescent psychiatry; other biological and cognitive-behavioral disciplines (neurology, psychology, neuroscience); health economics; other branches of medicine (pathology and pediatrics); and graduate medical education. Members and affiliations of the study Committee are given below.

The Committee was charged with carrying out an investigation designed to:

- Review the goals and objectives of residency training, emphasizing both core research training and career development, with the goal of providing advice to the Psychiatry Residency Review Committee (RRC) before the next scheduled review of residency requirements;
- Review successful patient-oriented research training programs with a view toward defining research training strategies for residents in non- or less-intensive research settings;
- Determine obstacles to research training during residency;
- Recommend strategies for overcoming these obstacles in a full range of academic settings.

A Call to Action

After 16 months of research and investigation that included five 2-day meetings, a public workshop, dialogue with experts and stakeholders, literature reviews, commissioned papers, and outreach mailings, the Committee issued its report and recommendations, *Research Training in Psychiatry Residency: Strategies for Reform*. (A prepublication version of the Report can be read online, www.nas.edu/books/0309090717.html. Publication of the final version by National Academies Press, (888) 624-8373, is expected by the end of 2003.)

Underlying the robust analyses and salient recommendations that form the body of these comprehensive considerations, the Report provides the field with unmistakable goals and mandates based on the Committee’s “uniform perceptions” of the need to:

- Ensure psychiatrists of the future a basic research literacy suited equally well to the life-long practice of evidence-based clinical practice and to the development of full-fledged research careers
- Elevate research training in psychiatry to a level at least equal to that attained in many other medical subspecialties (internal medicine, neurology)
- Effect coordination among the many ongoing efforts to train psychiatrist researchers in the belief that increased cooperation will yield substantial benefits to the broader psychiatric research effort
- Document the most productive strategies for producing the desired result
- Develop data with which to make the case for research literacy and career development to essential policy makers and medical educators

Overarching Recommendation

While the Report offers targeted recommendations that form clear prescriptions for every segment of the profession (see Recommendations, page 3), the Committee’s “*overarching recommendation*” calls for the formation of

“A national body...to foster the integration of research training into psychiatry residency and to monitor the outcome of efforts to do so....”

This national coordinating body is envisioned as being, simultaneously, a continuation of the IOM effort, a first step towards a more cohesive approach by the psychiatric community, and an instrument for implementing the Report’s specific recommendations.

Coming full circle, the NIMH is charged with taking the lead in organizing and funding this group of representative organizations and major stakeholders. The composition of the national body can be foreseen by the manner in which the Committee structured its recommendations. As represented in the chart on page 3, the Committee has framed recommendations in terms of the *obstacle* encountered, the *action* recommended, and the *constituency* or *constituencies* to which the action is addressed. Bringing these constituencies to the table will be the first step in implementing the IOM recommendations to the field.

The Report

The straightforward organization of the 272-page Report is based on a substantive analysis of the three domains that define both the obstacles and the opportunities for reform: *Regulatory Factors*, *Institutional Factors*, and *Personal Factors*. An initial chapter conceptualizes the pivotal period of *Residency as Part of a Longitudinal Career Continuum*, providing a critical link between past experience and future opportunities. The final chapter on *Future Directions* summarizes the recommended solutions. Notably, the Report also offers a cache of appended sections at least three of which contain compilations of information not to be found elsewhere as a single source. These are, *Appendix B*, Federal and Other Funding Mechanisms Listed and Summarized by Career Stage; *Appendix C*, Brief Descriptions of Psychiatry Residency Training Programs, Sorted by NIH 2002 Funding Rank for Each Corresponding Department; and, the 23-page section of *References*. ■

Committee on Incorporating Research into Psychiatry Residency Training

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OBSTACLE	RECOMMENDATION	CONSTITUENCY
Programmatic Factors		
Lack of mandatory & optional research experiences in residency	Create programmatic & funding pathways to link research training in residency with preceding & subsequent research experiences	Departments of psychiatry & funding agencies
Regulatory Factors		
Inflexible & excessive clinical training requirements	Reduce, and add flexibility to, requirements for board certification and residency accreditation,	ABPN and Psychiatry RRC
Ambiguous & insufficient research training requirements	Require patient-oriented research literacy as a core competency	ABPN & Psychiatry RRC
Lack of patient-oriented researchers on certification and accreditation bodies	Promote nomination of patient-oriented investigators to ABPN and RRC	Nominating bodies: AMA, APA, ABPN & other national stakeholders (AADPRT, AACP, ACDP)
Institutional Factors		
Institutional cost constraints	Encourage institutional investment in long-term business plans for research	University presidents, deans, & hospital CEO's
Shortage of mentors & role models during residency	Support research faculty as mentors in residency training	NIH, NIMH
Variable research curricula	Develop, integrate, and evaluate competency-based research curricula	NIH, NIMH, & other funding agencies
Insufficient support for middle tier programs	Support departments poised to improve residency-based research training	Funding agencies, NIH, NIMH
Personal Factors		
Financial well-being	Create financial incentives for committed patient-oriented research trainees	Funding agencies, foundations, & other 3 rd party supporters
Emphasis on negatives of research careers	Promote benefits of research & the growing scientific evidence base underlying practice of modern psychiatry	Individuals & institutions involved in education, mentoring, and communications
Unique programming needs of women, IMGs, & under-represented minorities	Develop strategies to recruit, train & retain women, IMGs, underrepresented minorities in research careers	Departments of psychiatry, academic medical centers, funding organizations



Residents' and Fellows' Corner

Writing a NIMH Mentored Career Development Award (a.k.a. "K Award"): Part I

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There is no doubt that we desperately need more researchers in psychiatry. However, I believe that instead of simply complaining about the shortage of junior investigators in psychiatry, we should be nurturing the interests of those who are even remotely considering a career in psychiatric research. One way to nurture this interest is to help junior investigators achieve one of the first major milestones in developing a research career, which is to obtain a research grant. Research grants may be supported by private foundations, pharmaceutical companies, or by one of the institutes of the National Institutes of Health (NIH). The National Institute of Mental Health, NIMH, most commonly sponsors psychiatric research. For physicians who are close to completing or who have completed their residency training, the NIH recommends a specific developmental trajectory for grant applications, the first of which is the career development award mechanism ("K award"). In this issue and the next, we will examine the K award application process, discuss some ways in which you can make this a more pleasant experience for yourself and those around you, and examine how NIMH might improve upon this process so that early-career psychiatrists are encouraged to pursue research careers.

What is a "K Award"?

There are several types of K awards. Those most relevant to early career psychiatrists are the K23 and K08 grant mechanisms:

"The purpose of the Mentored Patient-oriented Research Career Development Award (K23) is to support the career development of investigators who have made a commitment to focus their research endeavors on patient-oriented research. This mechanism provides support for three to five years of supervised study and

research for clinically trained professionals who have the potential to develop into productive, clinical investigators focusing on patient-oriented research." (NIMH Web site)

"The purpose of the Mentored Clinical Scientist Development Award (K08) is to support the development of outstanding clinician research scientists. This mechanism provides specialized study for individuals with a health professional doctoral degree committed to a career in laboratory or field-based research. Candidates must have the potential to develop into independent investigators. The K08 supports a three, four, or five year period of supervised research experience that may integrate didactic studies with laboratory or clinically-based research." (NIMH Web site)

In other words, a K award is a federally funded grant that provides partial salary and research support so that junior faculty may have protected research time (a minimum of 75 percent effort) to develop their research interests and careers. A K23 award is for those who engage in patient-oriented research and a K08 is for those whose research activities are more laboratory based and less patient related. There are two main components to a K award grant proposal, the career development and the research plans. The career development plan is an exercise in grandiose self-promotion and in developing a training plan that complements the research plan; the research plan is a fairly typical research grant proposal.

Thinking about a K Award?

The first stage in the process of writing a K23 career development award is to prepare to write the grant. This process can

involve anywhere from a year to several years. Yes, several years. In fact, the entire process, from thinking about a K proposal to receiving the award notification, typically takes at least five years. During the initial stage, the potential applicant is still enthusiastic and optimistic. At this stage applicants are not yet overwhelmed by the process. Therefore, they eagerly ruminate about what their general topic should be and collect information from those who have preceded them in this endeavor. After several years of observing potential applicants in this stage, I concluded that only a small percentage ever advance to the next stage, which is beginning to write the grant proposal. There are several potential explanations for this, including being overwhelmed by a daunting task, a lack of mentorship in psychiatry, and being frightened away by the negative experiences of predecessors.

In my opinion, there are several activities that you can engage in prior to and during the initial stage to improve your chances of being successful at the K process. First, begin early by participating in research during residency and as junior faculty. Protected research time is imperative to accomplish this task. Talk to senior researchers who have reputations as good mentors and establish a specific goal or project that may be accomplished in a small amount of time. It is neither realistic nor necessary to start from scratch. Many senior researchers have enormous amounts of unanalyzed data that they are willing to share with energetic residents or junior faculty. The goal should be to write and publish at least one peer-reviewed journal article as the first author. Although several first-author papers are typically necessary to successfully obtain a K award, one is at least a start.

It is important to be in a supportive environment and institution where there is a successful track record of obtaining K awards. In fact, there is a part of the application that focuses specifically on your institution's resources and the level of support that your institution and department are willing to provide. That is not to say that you can't be the first at your institution to be awarded a K. However, it is very helpful if those around have experience in the process. Similarly, it is essential to identify a qualified primary mentor for your K proposal. Typically, a good "K mentor" is someone who has been successful at obtaining NIH funding, someone who is at least an associate professor (some people have been criticized for not having a mentor who is a full professor), someone who has the experience of mentoring other K awardees (though someone who is currently mentoring too many K awardees may not have the time to be a K mentor), and ideally, someone with whom you have an established relationship and who is invested in helping you succeed. Mentoring someone on a K award is a time consuming endeavor that has little reward, except for the joy of watching your mentee succeed. Presently, mentors are not permitted to receive financial support from a K award for their time and effort. Since it is very difficult to find qualified mentors in psychiatry, it might be beneficial for NIMH to reconsider this policy, opting instead to reward qualified mentors for their efforts.

Travel awards (as discussed in the previous issue of this newsletter) are excellent opportunities to network with others who have undergone this process and learn from their successes and mistakes. Additionally, travel awards will allow you to meet potential consultants and advisors from outside your institution, whom you will need for your K proposal to enhance your application.

This stage in the process is also a good time to begin investigating the resources at your own institution. Although this involved a lot of time and effort, it was an

enlightening experience for me. I was naïve to the outstanding neuroscience and biostatistical expertise that was available at my institution. I was also pleasantly surprised at the willingness of very busy and productive senior faculty, even those outside my department, to serve as consultants and advisors.

As early as residency, you can begin to apply for private foundation and pharmaceutical sponsored research grants, which provide financial support to obtain preliminary data for K award proposals. The National Alliance for Research on Schizophrenia and Depression (www.mhsource.com/narsad) and the Klingenstein Third Generation Foundation (www.ktgf.org) are two private foundations that have specific funding mechanisms to provide financial support for early-career psychiatrists to obtain preliminary data for K award proposals. The American Psychiatric Association and the American Academy of Child and Adolescent Psychiatry also have pilot research awards that provide funding specifically for junior faculty. Most pharmaceutical companies invite investigator-initiated proposals that can also serve as a funding mechanism for preliminary data. Although to my knowledge there are no systematic data to support this statement, my impression is that most successful K applicants have had prior non-NIH funding that has allowed them to obtain preliminary data for their application.

Again, it is my opinion that only a small percentage of people who leave stage one ever enter to stage two of the process, which is the writing phase. During my child and adolescent psychiatry fellowship, I had the opportunity to attend two NIMH sponsored workshops aimed at teaching the basics of applying for a K award to potential K applicants in the field of child and adolescent psychiatry. Although I was overwhelmed by the first workshop I attended, the second time I learned an enormous number of useful tips that I believe were instrumental in facilitating my K experience. At these workshops, topics included understanding where your K proposal will be, literally every minute

from when you mail it to when you are awarded your grant, and what you can do to enhance your chances of submitting a successful application.

I would like to encourage those who lament the lack of psychiatric researchers to organize a lot more of these workshops and expand them to include adult psychiatrists.

It was at these meetings that I realized the different perspectives of early-career psychologists and psychiatrists. Although early-career psychiatrists and psychologists may be struggling with some of the same issues, there are distinct differences that are not adequately addressed in that the K process is the same for both professions. For example, after graduating residency, most psychiatrists will begin paying off their medical school loans, which often can add up to over \$100,000, where as most psychologists have not accumulated this amount of debt. Psychiatrists have the option of practicing in the community where they can easily earn double the amount that they would by staying in academics. Therefore, there is a low threshold for the frustrations and obstacles of establishing a research career and some potential researchers flee to private practice. In an effort to confront this trend, the NIH has recently established a Loan Repayment Program for those who pursue careers in patient-oriented research, and it is available to both M.D.s and Ph.D.s.

Although only a small percentage of psychiatrists will ever advance past stage one of the K process, it seems that most of those who enter stage two and actually begin to write, do eventually complete and submit a K proposal to NIMH. However, only 30-40 percent of K proposals submitted to NIMH receive funding, typically after several submissions and revisions.

Discouraged? Don't be. In the next issue, we will examine the next stages in the K process, some personal accounts of the experience, and how to increase your odds of success. ■

Building Research Careers



Writing a NIMH Mentored Career Development Award (a.k.a. "K Award"): Part II

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I would like to thank the APA Psychiatric Research Report (PRR) for inviting me to write a new column that will explore subjects I have encountered as a junior faculty member and that, hopefully, will be relevant to other junior faculty members who are also pursuing careers in academic psychiatry.

Part I: A summary

For those who missed the first of this series on Career Development Awards (K Awards), in Part I (see *PRR Summer 2002*) we examined some of the steps that potential applicants should take prior to writing a K Award application and acknowledged that this is a long-term commitment taking several years from conception to implementation. In summary, potential applicants should plan ahead by seeking out foundation or pharmaceutical grants to support preliminary data, by finding an appropriate primary mentor, by writing several peer-reviewed manuscripts, and by anticipating that this is a long process taking several years to complete successfully.

We also reviewed several suggestions that might make the process more amicable, including possible incentives for mentors and advisors, additional NIH-sponsored workshops to teach potential applicants how to apply for a K Award, and programs like the NIH Loan Repayment Program (LRP) for physicians who are ambivalent about pursuing a research career because of the substantial debt they have accumulated during medical school.

Part II: Preparing your grant application

In this issue we will examine the next steps in the process, writing and submitting your K proposal. You have completed the preparatory and preliminary work, developed a general idea for your career development and research plans, found a number of advisors (this number might range from four to fourteen), and established who your primary mentor(s) will be (at most you should have two). Next, you are ready to actually write your K Award proposal.

At this time, you should contact program staff at the relevant NIH institutes, since it is NIH programs that fund your grant. Program staff, however, do not usually review grant applications (this is carried out by peer-review committees – more on this later). The NIH Web site is very helpful and can be a good resource for you during the grant application and funding process. For the appropriate NIMH program to contact, please refer to www.nimh.nih.gov/grants/Program_Contact.cfm. (Other institutes have similar Web pages with contact information.) Most divisions within institutes have programs that are specific for training grants. "Program people" are typically very friendly and helpful at guiding you through the process. They will tell you if your proposed research is appropriate and of interest for their program, and if not, they will help you find a program that might be interested in your proposal. Institute program staff can sit in on the review of your grant application (although they are unable to participate in the review itself) and therefore can help you interpret comments from reviewers. It is useful to keep in contact with your program person throughout the grant application and review process.

I would suggest that you *plan* for at least three months of intense writing, and then you might realistically spend two months, which should be enough to write the proposal. Before you begin to write make sure that you have seen the format of a funded K Award. Most people are willing to share their grants, but if you are unable to find a successful K Award application, copies of funded K Awards are provided at NIH-sponsored K workshops.

The biggest mistake that applicants can make is failing to leave enough time for mentors and advisors to read the proposal and provide feedback. I suggest figuring out far in advance of the due date which of your advisors will want to read your grant application and when they will need it to ensure adequate time for feedback and revision. You want to make sure that at least two of your mentors and advisors will read the proposal in detail and that they have had prior experience with successful grant writing. I suggest that you complete at least a good draft of the entire application one month before the deadline. Additionally, once you have completed a section of the grant, I suggest sending it out for feedback. Don't wait until the entire grant is written to start revising.

Unfortunately, you will probably encounter a situation where two of your advisors disagree or hold opposing views on a topic. Don't panic, this is not uncommon, and as I came to realize, it is one of your first steps in transitioning to an independent investigator. If both opinions are from experts in the field and they disagree, there is probably no correct answer, and therefore you need to make your own decision about what you think is best.

The career development plan

When you sit down at your computer to write the initial words of your proposal, what lies ahead might seem like an insurmountable task, but you have actually completed the most difficult part of the process — devoting time to sit down to write.

Although many might differ, I believe beginning with the career development plan section of the grant application is essential. This not only sets the tone for the research plan but will also enable you to develop a research plan that jives with your career development plan. The career development plan informs the reviewers about you, your research interests and accomplishments, and your career goals and ambitions.

In my opinion, it is much easier to develop a research plan around the theme of your academic life, which ideally has been established by years of work, than it is to create a theme for your career development plan based on the research plan! After all, you are applying for a Career Development Award. Furthermore, from my experience, it is easier to correct a weaker research plan than to change the theme (or lack thereof) of your academic life. The career development plan might take longer to write, since most of us have had experience at writing research proposals, but few of us have had experience writing a career development plan. Remember, successful career development plans generally include some educational experiences related to research ethics and statistical analyses.

The research plan

The next section to tackle is the research plan, which needs to have aims that clearly coincide with those of the career development plan. In fact, it is helpful to specifically point out for the reviewers the connections among the aims and goals of the research and career development plans. It is desirable to write a focused research plan for a particular study with mention of a more general plan, for later years of the award, which includes obtaining preliminary data for an R01 grant — the next step in an academic career.

“Other” sections

Lastly, you will complete the other sections of the grant application that require letters of support and biosketches from your advisors, mentors, and department chairs as well as at least three other letters of recommendation. Additionally, you will need to complete preliminary information on your budget and other general information sections. The collection and writing of these materials is a significant hassle since it will depend on other very busy people; however, if you have made it this far, you

are almost at the finish line. At this point you are probably awake late at night placing the final touches on your proposal and the mindless busy work is welcomed. Remember to give your advisors and mentors enough time to complete their tasks and be very clear about what it is you will need to receive from them.

So now that you have completed writing, rewriting, and revising your grant application, it is time to send it to NIH. Hopefully, you have left plenty of time and have not waited until the last minute. I do not recommend driving to the airport in the middle of the night before the deadline so that you can send the application on the last plane from your city to NIH. However, before mailing the completed proposal, check and recheck it for mistakes and to make sure that you have included all that is necessary. Pay particular attention to make sure you have used the correct NIH forms and that you did not “cut and paste” erroneously.

The review process

Most grant applications submitted to the NIH are reviewed by one of the numerous study sections overseen by the NIH Center for Scientific Review. A study section is composed of a group of senior investigators who will review your grant application. Your reviewers will not necessarily have expertise in your specific area of research, which you should keep in mind while writing your proposal. Some, however, including intervention and services proposals, are reviewed by study sections that are administered at the institute level. Several institutes (like NIDA) have specific committees that review training grants. NIMH does not have such a committee and therefore K Award applications come before reviewers who are also reviewing applications submitted by senior investigators. In order to encourage junior investigators to submit career development awards and pursue careers in psychiatric research, it might be beneficial to create a study section governed by NIMH (or any other institute that accepts mental health-related applications) that only reviews training grants. As we discussed in Part I, M.D.’s and Ph.D.’s have different training paths and therefore it might be beneficial to ensure that at least one of the primary reviewers for a K23 Award is an M.D., which often is not the case.

A cover letter sent along with your grant application might help guide your proposal to a specific study section. Your program person might be able to recommend a study section that best suits your research. A cover letter does not guarantee that your proposal will be assigned to the study section you requested, but it might help. Refer to the Center for Scientific Review Web site (www.csr.nih.gov) to research which study section might best suit your grant application and to identify the roster for that study section.

Postpartum

After you send off your grant proposal, I recommend following its status, that is, knowing when it will be reviewed and by which study section. You can do this at the NIH Electronic Research Administration Web site, <https://commons.era.nih.gov/>

Expect to be in a post-application delirium for at least a few days following your first NIH submission. Bad dreams and nightmares are not uncommon; however, these will dissipate as time goes on. After all, it will be at least four or five months until you hear about the outcome.

Finally, after you send your proposal to NIH don’t forget to spend some time reacquainting yourself with your family, friends, and colleagues who have supported you through this process. Then, as the delirium clears, begin to attend to the huge pile of work that you have put off for weeks!

Next

In the next column we will explore in further detail the K Award scoring and resubmission procedures and examine the risks and benefits of having a Career Development aAward so that those who are thinking of applying can do so with informed consent. ■

Building Research Careers



Writing a NIMH Mentored Career Development Award (a.k.a. "K Award"): Part III

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In the third part of this series about NIMH Career Development Awards (K Awards), we will complete our discussion of the review, scoring, and reapplication process. We will also examine some of the advantages and disadvantages of having a K Award.

The review process: revisited

In Part II of this series we briefly described what happens to your K application after it is mailed to NIH. There are three submission deadlines each year: February 1, June 1, and October 1 (see deadlines for resubmission, below). It is preferable to finish your application well in advance of the deadline so that you have time to review the final application and make certain that it is complete. Typically, your application is sent to the NIH Center for Scientific Review (CSR) where it is assigned to a study section whose members will review your proposal. You may want to include a cover letter with your application requesting assignment to a specific study section and institute program.

It takes approximately four to five months from the time that you mail your application until the review committee meets. However, you should receive notification of receipt from NIH within two months after submitting the application. This letter will list the institute, program, and study section to which your application has been assigned.

After sending your application to NIH, it is useful to again contact the NIH program people who have guided you through the application process to let them know you have submitted your application and requested assignment to their program. Additionally, it may be helpful to send the program staff a final copy of your grant application so that they are aware of and can track your submission. I suggest maintaining contact with the program staff throughout the review process. In fact, you might want to inform the program staff once you receive notification of receipt from CSR confirming the study section to which your grant has been assigned for review. Although they are not permitted to actively participate in the review meeting, NIH program staff may attend the review of your application and thus be helpful in understanding reviewer comments, especially if resubmission is necessary.

"If at first you don't succeed...."

The priority score for your K application is available within a few days following the study section meeting. However, it often takes an additional month to receive written feedback from the review committee.

The **MAJORITY** of people who apply for a K Award do not receive a priority score that will lead to funding of their initial submission. In other words, most applicants will have to revise and resubmit their application. Therefore, do not expect that your first submission will receive funding, and try to resist the deflation that accompanies an unfundable priority score. In fact, if you receive a good score that is not within the funding range, I recommend celebrating your accomplishment. The tendency to feel frustrated and discouraged at this point leads too many physicians to drop out and change career paths. This is a critical stage for physician scientists. NIMH data indicate that although M.D. and Ph.D. candidates apply for K Awards at the same rate, and receive comparable first-time priority scores, the resubmission rate for Ph.D. applicants is approximately double that of M.D. candidates, producing a physician dropout rate that probably accounts for the greater number of Ph.D.s ultimately successful in obtaining career awards.

Your initial score, however, is an important indicator and predictor of the extent to which you will need to revise your application. Once you receive the reviewers' comments read them, reread them, and then put them away for a while. Share them with your mentors and advisors and ask for feedback. Discuss your reviews with the program people who, hopefully, attended the study section meeting and can help you interpret the written reviews.

Allow at least one month to revise your application. Also, remember to allow enough time for mentors and advisors to read the revisions prior to the resubmission deadlines, (March 1, July 1, and November 1). The *"introduction to the revised application"* section is of paramount importance. This is the section where you will concisely describe the changes you have made in response to the reviewers' comments, and it should be your highest priority for the revised application. Do not argue with the reviewers! Instead, demonstrate an appreciation for the time and effort the reviewers dedicated to reading and commenting on your application.

"One, two, three strikes you're out....."

NIH allows a total of three submissions: an initial application and two revisions. After the third time you are not permitted to submit the same K application. However, you may submit a new K

application with significant changes and a new title. Many people apply for a second round of three attempts. In general, persistence does pay off. When submitting a new application, be sure to closely re-examine your original application and the reviewers' comments, enlist the assistance of experienced mentors and program staff, and follow their recommendations. Most importantly, *do not give up*.

Risks and Benefits

There are many advantages to finally being awarded your K grant. You will receive at least 75% salary support and some research funds for up to five years. You will also have committed to enrolling in classes as a part of your career development plan. Most likely you will have dramatically underestimated the time needed to actually study for the classes. You have the option of enrolling in the classes for credit or for audit. However, taking the classes for credit may be preferable, if you intend to learn anything. Many take this opportunity to earn another degree, such as a Ph.D. or a Master's degree. However, you need to consider the risks and benefits of committing the amount of time needed to complete another degree. On the other hand, having a K Award allows you the luxury of being paid to attend classes that interest you, so take advantage.

One significant drawback of receiving a K is that once awarded, you are required to give up any other NIH salary support. This is a problem since the K does not fund your entire salary. The rationale for this restriction has several flaws, and a reconsideration of this policy might result in additional junior investigators applying for K grants.

Summary

In summary, we have reviewed several essential steps that potential applicants can take to improve their chances of success:

- 1- Begin to think about a K application several *years* before actually writing the grant application. Check out the NIH Web site (www.nih.gov) and search under Career Development Awards for the full array of available awards.
- 2- Apply for foundation or pharmaceutical grant support in order to obtain preliminary data.
- 3- Apply for travel awards to attend meetings so that you can meet potential advisors and mentors.
- 4- Establish communication and working relationships with appropriate primary mentors and advisors.
- 5- Write several peer-reviewed manuscripts.
- 6- Talk to others who have written/received K grants and review their applications.
- 7- Attend a NIH workshop on writing a K Award.
- 8- Find a NIH institute and program that best suits your application and talk with the appropriate program staff (preferably those who specialize in career development programs) far in advance of the submission deadline.

- 9- Allow ample time to write your application (several months) and consider building your proposal around the career development section.
- 10- Allow ample time for your advisors and mentors to read the application and to provide feedback.
- 11- Read your application several times before submission. Ask someone who has not previously read the application to examine it as well.
- 12- Send a cover letter to CSR with your application requesting the study section you think is most suited to review the content of your application. Making recommendations may help direct the application to reviewers with the appropriate expertise.
- 13- Send the NIH program staff a copy of your final application (with a cover letter) so that they are aware of your submission.
- 14- Check to ensure that your application has arrived at the appropriate place in time to meet submission deadlines.
- 15- Before and after your application has been reviewed, maintain contact with the appropriate institute program staff. They can help you to interpret the reviewers' comments.
- 16- Submit, resubmit, and do not give up!!!!

There are also several suggestions that might make this process more friendly and thus might increase junior faculty interest in applying for a K grant:

- 1- NIMH and other NIH institutes should sponsor additional K workshops to teach potential applicants about the process and make it less intimidating.
- 2- There should be an effort made to increase the incentives for mentors and advisors to participate in K Awards (i.e., salary support for mentors).
- 3- Continue and expand programs like the NIH Loan Repayment Program (LRP) for physicians who are ambivalent about pursuing a research career because of substantial accumulated debt from medical school.
- 4- Create a study section, within NIMH, that reviews only K applications (and other training grant applications). This will also help to ensure that K resubmissions are not re-reviewed by an entirely new committee.
- 5- At least one of the reviewers, on all physician applications, should be a physician.
- 6- Reconsider the policy that K awardees cannot receive salary support from NIH grants other than their K Award. ■

From the Council on Research



In the Spring 2002 issue of the PRR, Michele Pato, M.D., Chair of the APA Committee on Research Training, described the seminal NIMH/APA Workshop on Research Training for Psychiatrists. Four models of residency research training programs were presented as part of the Workshop agenda. As promised by Dr. Pato in the previous issue, each program will also be presented here in a series of articles that we hope will begin a continuing survey focused on research training, in its various shapes and sizes, within psychiatry residency programs throughout the U.S. The first to be presented at the NIMH/APA Workshop, and the first to be described here, is the program at the University of Michigan School of Medicine, Department of Psychiatry, John F. Greden, M.D., Chair.

Robert McCullumsmith completed his five-year residency in June 2002 and is currently a lecturer in the Department of Psychiatry and a research investigator in the Mental Health Research Institute, University of Michigan Medical School.

Training the Next Generation of Biological Psychiatrists

The Michigan Model

Robert McCullumsmith, M.D., Ph.D.

Recent trends indicate the continued shortage of trainees to perform and lead the next generation of psychiatric research. A NIMH/APA Workshop on Research Training for Psychiatrists, held in November 2001, characterized this problem as a crisis and compared it to a leaky pipeline, due to the attrition of candidates at all phases of training. Several innovative approaches to address this problem have been developed around the country at undergraduate, medical school and post-graduate levels. This article describes one program designed to prepare the research-oriented psychiatry resident to successfully enter and navigate an instructional track career in biological psychiatry.

The University of Michigan Psychiatry Residency Research Track

The Residency Research Track (RRT) was started in 1983 with the goal of providing a *longitudinal* research experience for residents interested in a research career. The RRT is a five-year program, with up to 18 months of protected research time. The program typically begins in the PGY-2 year, with the selection of a research mentor and formulation of a research project with this mentor. Research time in the PGY-2 year is provided in one-month blocks to facilitate integration with the one-month long 2nd year clinical rotations. In the PGY-3 through PGY-5 years, time is usually divided approximately 50 percent research and 50 percent clinical, a format permissible due to the structure of the outpatient clinical rotations at the University of Michigan. RRT participants do not have a diminished clinical training pathway in the name of research training and complete the same basic requirements as residents not in the RRT. In addition to attending the regular core lectures for psychiatry residents, RRT participants have a weekly one-hour core didactic focused on such topics as career development and grantsmanship. The RRT is currently funded by the NIMH R25 mechanism as a Mental Health Education Grant.

Entering the pipeline: The RRT experience

My interest in academic psychiatry developed late in my third year of medical school. With a Ph.D. in lung pathology, I was planning to enter a pathology residency program when I fell in love with clinical psychiatry during the third-year psychiatry clerkship. My somewhat naïve dilemma at the time was that I did not think there were any good psychiatric research opportunities. Delighted to find that I was in error, I matched in psychiatry at the University of Michigan with its Mental Health Research Institute. Thus began my transition from lung to brain. During my internship year, I met my mentor, Dr. James Meador-Woodruff. At a roundtable discussion during the post-grand rounds luncheon, he asked about my research plans. After lunch, Dr. Meador-Woodruff, now director of the RRT, introduced himself and expressed an interest in helping me find a place to do the type of research in which I was interested. This was the first mentoring interaction I had with Dr. Meador-Woodruff, an interaction that underscores the importance of both access to first-rate scientists as well as the process and development of the mentor-mentee relationship.

Under the guidance of my new mentor, I developed a research proposal, joined the RRT, and had two one-month blocks of research time early in my PGY-2 year. This allowed me to acclimate to a new laboratory and get a project started that I could work on in my free time, evenings, and weekends throughout the PGY-2 year. The timing of my laboratory rotations early in the academic year permitted me the opportunity to submit an abstract and attend my first national scientific psychiatry meeting that spring.

The most important aspect of the protected research time in the PGY-2 year was simply that I returned to the laboratory. From my junior year in college through the end of my Ph.D. training, at no time was I unaffiliated with a laboratory, including the first two

years of medical school. Following completion of my Ph.D. in graduate school, I had only three years away from the laboratory (years 3 and 4 of medical school and my PGY-1 year). For some of my colleagues this transition took up to five years, as many psychiatry and non-psychiatry residencies do not have research experiences until the PGY-4 year. In one instance, a good friend of mine whose research focus is in human genetics had a five-year gap away from the lab; in this span, the human genome was cloned and new techniques such as microarrays were developed.

Staying in the pipeline: Some lessons and some successes

My PGY-3 year was divided equally between clinical and research time, a difficult but invigorating balance. I arranged my schedule to have two full days and one half day of laboratory and clinic time each week. Full lab days on Mondays and Fridays allowed me to begin experiments on Sunday or finish them on a Saturday, with a half day on Wednesday to keep laboratory projects moving. This so-called partial immersion in two activities that could occupy all of your time can be frustrating. During the same day, you have to shift your focus from seeing patients (for example, two medicine checks, a psychotherapy session, and a new patient evaluation) to getting your sequencing gel loaded, PCR primers designed and *in situ* films developed. This issue of divided time has been a frequent topic of discussion during RRT didactics led by instructional track faculty who have suggested that the split format beginning in the PGY-3 is similar to the type of schedule that RRT participants may have when they become faculty.

The format of the RRT core is informal, and most of the didactics sessions follow one of two themes. Faculty are invited to talk about their specific career pathways in academic psychiatry, with particular focus on transitions and the decision making involved in various career choices. The other theme is what I call academic tool development, with sessions on topics such as grantsmanship, writing papers, and statistical methods. For example, we recently had a series of didactics sessions in which the presenter provided his most recent RO1 grant application including the reviewers' comments (pink sheets) as the topic for discussion. In addition to demonstrating that pink sheets are no longer actually pink, he went through each reviewer's comments point-by-point and provided his perspective on how he could have improved the application. One ongoing highlight of the RRT core is simply the face-to-face time spent with faculty who operate successfully funded research programs. Such exposure to first-rate neuroscience-oriented psychiatrists has provided me with a great deal of

motivation and perhaps most importantly a glimpse of my future career trajectory.

As I reflect on my five years of residency at the University of Michigan in the RRT, there have been some highlights. I have published papers in first-rate journals, won some awards including a travel award to the prestigious American College of Neuropsychopharmacology (ACNP) meeting, and successfully competed for both internal and external funding to support my current and future research efforts. These achievements will hopefully provide the momentum necessary for me to enter the next section of the academic pipeline.

Two features of the University of Michigan Residency Research Track that I believe made these successes possible are administrative flexibility and mentorship. In my case, the planning and scheduling of clinical experiences were designed to minimize interference with my research efforts, without shortening or compromising my clinical training. Further, I benefited from timely and extraordinarily effective mentorship primarily from my formal laboratory mentor and also, from time to time, from other faculty in the department.

Plugging the leaks: Streamlined clinical training and debt reduction

My successful (so far) experience at the University of Michigan highlights the effectiveness of emphasizing research training during the psychiatry residency. The RRT at the University of Michigan is just one of several innovative programs in place around the country with the goal of increasing both inflow and outflow into successful biological psychiatry research. However, a handful of innovative programs is insufficient to plug the leaky pipeline, and more solutions are needed.

At the NIMH/APA meeting in November, several novel approaches to this problem were discussed including streamlining clinical training to provide more research time and paying off education loans. An informal poll of RRT participants at the University of Michigan indicated that the length of training was not a barrier to the pursuit of a research career; low salaries and heavy debt loads *were* perceived as significant barriers. The NIH has implemented a loan payback program to facilitate debt reduction post-residency, but I hope for an ongoing dialogue in the psychiatric research community to address other approaches to remedy the shortage of academic investigators. ■

From the Council on Research

Presented below is the second in a series of four articles on models of research training in psychiatry residency programs. All four models were originally addressed at the NIMH-APA Workshop on Research Training for Psychiatrists, November 7, 2001.

Building Bridges The Pittsburgh Model of Research Career Development

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National concerns about the dwindling supply of physician-scientists and declining research training opportunities for psychiatrists have led to a national dialogue on new strategies to recruit and train the next generation of psychiatric researchers. In November 2001, the APA and NIMH jointly sponsored a Workshop on Research Training for Psychiatrists. This article focuses on one of the four training models presented at the Workshop, the University of Pittsburgh's approach to attracting, cultivating, and retaining junior research psychiatrists.

Contributing to the decline in psychiatry researchers, the path to a career in research is littered with a series of obstacles—including lacunae in research training opportunities, inadequate mentoring, and competing clinical demands—which threaten to derail all but the most tenacious nascent investigator. Pittsburgh's model can be understood as a series of bridges that help young investigators to overcome these obstacles, enabling them to stay on the research path throughout the early stages of their career development.

A Developmental Pathway

The Department of Psychiatry at the University of Pittsburgh is committed to providing research training opportunities across the developmental trajectory of early career psychiatrists. From undergraduate and medical school opportunities to the first year of residency through the junior faculty level, a variety of flexible research training experiences attract potential researchers at all stages of early career development. We will briefly describe the current training programs at the residency level and above, review the general principles of all research training programs at Western Psychiatric Institute and Clinic (WPIC), and then discuss in more detail

the Junior Faculty Scholar Program.

Residency: The residency research track is open to all psychiatry residents at the University of Pittsburgh School of Medicine. Approximately half of the participants commit to the program at the beginning of their residencies and the other half join later. Entry into the research track is relatively informal (e.g., there is no separate match for this track), involving brief written statements of interest along with interviews with director of the track, Ronald Dahl, M.D., and Executive Vice Chair of the Department, Harold Pincus, M.D. The program is moderately structured, consisting of monthly meetings and an increasing percentage of time spent on research activities as training progresses. Because of the heavier clinical service and educational requirements of the PGY-1 and PGY-2 years, research-related activities during these initial years are usually limited to setting up research opportunities that are pursued more vigorously during the PGY-3 and 4 years. Up to half of the PGY-3 year and the full PGY-4 year can be dedicated to research related activities. In addition to engaging in research projects, participants have used this time to partake of various other research-related pursuits such as formal course work and starting concurrent graduate degree programs.

Members of the research track meet on a regular basis, congregating monthly to engage in informal discussions about topics such as mentorship (an important and recurring topic), funding, and conference attendance. In these dinner meetings, which alternate between Dr. Pincus's home and WPIC, participants update each other on their progress and discuss frustrating encounters related to research and training. Co-residents and course leaders offer informational and peer support, helping

trainees develop problem-solving strategies as needed. In addition, specific benchmarks for self-assessment are provided to trainees to help them evaluate their progress. Although there have been ongoing discussions of further formalizing the requirements of the research track, these meetings have provided a venue to maintain *de facto* standards simply by keeping participants apace with each other.

Post-Residency/Fellowships: In the spirit of providing bridges to a research career across the developmental continuum, the Department of Psychiatry administers several Institutional Research Training grants (T32) for M.D., Ph.D., and M.D./Ph.D. post-graduate trainees. These two-year fellowship programs recruit recent graduates interested in topics such as child psychiatry, late-life mood disorders, and psychiatric epidemiology. Some graduates of the residency research track enter these fellowship programs and others enter with little or no prior research experience. The fellowships support a full-time commitment to research, enabling fellows to conduct small research projects and submit grant applications. The program is organized around the Survival Skills Seminar, a weekly meeting of fellows and senior faculty course leaders, designed to teach fellows essential skills necessary for a research career. Using a peer-review process modeled after an NIMH study section, the Survival Skills Seminar helps fellows hone their grant writing skills and learn to work more effectively with mentors. The Seminar also covers topics such as research ethics, curriculum vitae preparation, and multidisciplinary collaboration.

Junior Faculty: A survey conducted by Pincus et al. found that the median time between the end of research training and receipt of the first extramural grant was

three years. Bridging this critical time period, the Junior Faculty Scholars (JFS) Program (Mental Health Education Grant, R25 MH60473, Reynolds, P.I. and Pilkonis, Co-P.I.), is designed to help junior faculty transition to the status of independent investigator. A novel approach to address the high rates of attrition from the research trajectory during the first years of a faculty appointment, the JFS Program to date has enrolled 17 trainees, 11 of whom (65%) have successfully garnered an initial career development award (K01, K08 or K23). The JFS Program provides partial salary support (25%) for up to eight faculty members selected for two-year appointments, supporting junior faculty with a broad range of research interests. Some scholars find additional sources of salary support, ideally freeing 50 percent of their time for research-related activities.

The program specifically recruits individuals committed to eight identified priority research areas: neuroscience and neuroimaging, genetics, treatment outcome research, health services research, developmental psychopathology, geriatrics, the relationship between mental and physical health, epidemiology and population-based studies. A statistician is available to JFS participants to provide support for the establishment of databases, strategies for data management, as well as data analyses and reports.

All JFS participants convene weekly for a seminar loosely modeled on the Survival Skills Seminar offered to research fellows. As mature learners, junior faculty scholars use a problem-based learning approach to tackling issues such as grantsmanship, balancing career and personal life, mentoring problems, and academic promotions. In addition, a didactic program focuses on providing participants with multidisciplinary, scientific literacy (i.e., neuroimaging, genetics, large-scale clinical trials) so that graduates will be able to engage in scientific dialogues that transcend narrow areas of expertise. The program also provides a small amount of funding for pilot studies that can be used to generate data essential to the submission of an initial career development award.

General Principles of Research Training
Mentoring, mentoring, mentoring: Only partly in jest, WPIC educators assert that the top three research training priorities are mentoring, mentoring, and mentoring. In each of the training programs, course leaders provide systematic advice on

selecting an appropriate mentor and nurturing the mentoring relationship. In the earliest stages, a research candidate is encouraged to meet with several senior faculty scientists to evaluate mutuality of research interests and goodness of the interpersonal fit. As the research training progresses, “meta-mentoring” (i.e., several senior faculty meeting regularly with young investigators to discuss mentoring issues) helps research trainees optimize the mentoring relationship and manage potential difficulties. On an administrative level, the Department systematically selects faculty with strong mentoring skills and interests. In addition, mentoring is formally “incentivized” by incorporating mentoring activities into routine faculty performance evaluations and bonus compensation opportunities.

Flexibility: The Department of Psychiatry stresses the importance of flexibility both within individual programs and across the programmatic research training enterprise. Although some residents are committed to research careers from the outset, others become interested later in their training. The flow of opportunities across the developmental trajectories enables individuals to “join up,” without regard to level of training. For those who commit to the process from the outset, participation in the full sequence of training programs enables participants to expand their research skills as they advance through the early part of their careers.

Colleagues/Peers: The size and scope of WPIC research and training activities assures an impressive critical mass of colleagues at each developmental stage. Building on these natural opportunities for collegial interactions, research trainees at WPIC participate in problem-based learning exercises that focus on peer review of draft research proposals, manuscripts, etc. Using a process that is modeled on NIMH study sections, trainees are encouraged to critique one another’s work which hones scholarship and exposes the group to a range of scientific topics. Peer consultation on rough drafts is far less threatening than formal scientific review and enables even hesitant trainees to solicit input at the earliest stages of grant and manuscript development. In addition, peer support decreases potential feelings of isolation experienced by many junior investigators and provides exposure to potential future collaborators from other disciplines and labs.

Research Opportunities/Collaborations:

Participation in a structured training program confers upon its participants a stamp of legitimacy that facilitates collaboration with other investigators, both within the University and at a national level. Program leaders help match trainees to potential mentors and encourage even timid individuals to avail themselves of the opportunity to meet with faculty researchers (including visiting scholars from other institutions who are invited to give grand rounds or other academic presentations). In addition, the Department of Psychiatry actively recruits researchers from other disciplines (medicine, social work, pediatrics), encouraging collaborations that cross traditional lines and ideologies.

Infrastructure: In addition to mentoring and research skill-building, junior investigators need access to a research infrastructure that supports their research endeavors. All training programs provide at least partial salary support to free the trainee from a portion of their clinical responsibilities. The JFS Program includes salary support for a statistician who is available for consultation and assistance with statistical analyses. Several mechanisms within the University of Pittsburgh offer seed money grants to generate pilot data for extramural grant applications, including the child (P30 MH66371, Brent, P.I), mid-life (P30 MH30915, Kupfer, P.I.), and late-life (P30 MH52247, Reynolds, P.I.) Specialized Mental Health Intervention Research Centers. These large center grants also provide key research infrastructure such as data management and administrative support for affiliated junior investigators. Finally, an internal review committee rigorously reviews all grant applications prior to submission to external agencies, enhancing the quality of the applications.

A Personal Perspective (H.A.S.)

As summarized above, the JFS Program, funded by an R25 grant from NIMH, is designed to help junior faculty transition to the status of independent investigator. When the program began in 1999, I was among the first “class” of junior faculty to receive salary support through this mechanism. I entered the program with defined research interests and an established relationship with a senior scientist mentor. However, I lacked many of the fundamental skills that I would need to embark on a career in research. In fact, I doubted my

(continued on next page)

capacity to write a fundable grant and identified myself as a clinician rather than a researcher. As someone who was likely to stumble over the obstacles in my career path, the JFS program provided me with a bridge from clinical work to research at a critical juncture in my professional development. Through the JFS Program, I learned about the NIMH funding machinery, established a timeline for writing a career development application, subjected my proposal to internal peer review, and received encouragement when I needed it the most. I submitted an application for a Mentored Patient-Oriented Research Career Development Award (K23) on February 1, 2001 and received notice that it would be funded in January, 2002.

As I reflect on the role of the JFS Program in the development of my research career, I can identify several components of the process that I found especially helpful. From a practical standpoint, protected research time enabled me to collect and analyze pilot data and then write the grant application. Access to a statistician was critically important as I attempted to understand the data I collected and to write the methods section of the grant. The program directors (Charles F. Reynolds III, M.D., and Paul A. Pilkonis, Ph.D.) were invaluable resources for finding answers to research questions, both mundane (Are “pink sheets” really pink?) and profound (How do you balance your academic career with your personal life?).

Weekly seminars, modeled on the fellowships’ Survival Skills Seminar, are an essential part of the JFS experience. As a problem-based seminar, the content of individual sessions reflects the interests and needs of participating trainees. For me, some of the most helpful discussions involved the NIH review process. At the beginning, I did not even know the questions I should ask. Therefore, it was invaluable for me to learn that there were differences between a K23 and K01 award and that it is advisable to contact the NIMH program officer before submitting a grant (I first had to ask, “What is a program officer?”). Generous colleagues offered to share with the group their previously submitted applications and “pink sheets,” enabling the rest of us to learn from their successes and failures. When more complicated problems arose (What do you do if you think your grant has been assigned to the wrong review committee? What if your priority score is on the

margin of being fundable?), we turned to Drs. Reynolds and Pilkonis for guidance and advice. In addition, because we each presented our work to the group on a rotating schedule I had helpful “deadlines” that encouraged me to stick to the timeline that I had established for myself. Incisive feedback from course leaders and peers strengthened early iterations of my application and helped me refine my hypotheses—even though the process was sometimes psychologically grueling.

Weekly group meetings also provided me with invaluable exposure to other scientific disciplines. The JFS-sponsored formal mini-courses on topics such as neuroimaging and epidemiology were educational and interesting. However, it was through the process of reviewing the work of other JFS colleagues that I came to appreciate more fully the complex issues facing cognitive scientists, behavioral medicine scientists, and health economists. In addition to increasing my awareness of research projects across the Department, this process built a foundation for future collaboration and consultation with other JFS colleagues. In fact, I frequently contact former JFS “classmates” to ask their advice on topics outside my area of expertise (i.e., What instrument should I use to assess childhood depression in a low income population? Can you recommend a developmental psychologist to consult on my project?). We often discussed mentoring issues during our weekly JFS meetings, and I was able to think critically about the attributes that make (or break) a mentoring relationship. Although I am lucky enough to enjoy a relatively frictionless relationship with my mentor, I am hopeful that these discussions will enable me to be a better mentor to others in the years ahead.

Finally, the JFS Program played an important psychological role in my transition to the role of a research psychiatrist. The program was, for me, the first formal statement and recognition of my research careers goals. In addition to providing me with skills, structure, and support, it gave me research “credentials” within the Department which in turn opened doors for invitations to research symposia, speaking opportunities, and research collaborations. In retrospect, the process of participating in weekly meetings with other researchers, declaring my research interests, and preparing a grant submission to NIMH helped to consoli-

date my professional identity and move me back into the research pipeline. I also think that as a female physician, the chance to participate in this program later in my career (i.e., at the junior faculty level) was especially important. It rescued me from the fate of some female colleagues who, like myself, opted out of the academic track for a few years in order to have children—but then, unlike me, never had the opportunity to return.

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The Third Annual Career Development Institute

*A workshop on Launching and Maintaining a
Career in Mental Health Research*

April 17 - 20, 2004
University of Pittsburgh • Pittsburgh, Pennsylvania

The Third Annual Career Development Institute, a workshop on launching and maintaining a career in mental health research, jointly sponsored by the University of Pittsburgh and Stanford University, will be held at the University Pittsburgh April 17 - 20, 2004.

The aims of the CDI are to offer a broad-based group of young investigators increased general knowledge of what a research career involves in academic psychiatry; provide an update on new methods in psychiatric research; discuss strategies for shortening the time interval between the end of the research training period and receipt of the first extramural grant support; and to foster relationships with established investigators, who could work over the long term as mentors or consultants, and with other developing investigators in order to facilitate peer support and collaborative research. Presenters at the Institute will include officials from the National Institute of Mental Health, senior research investigators, and junior faculty scholars.

Some of the topics that will be covered at the CDI are;

- **Longitudinal view of research training and professional development**
- **Relationship Building (mentoring, national and international collaboration, consulting, and funding agencies)**
- **Scientific Autobiographies**
- **Project Management (IRB issues, recruitment issues, data management and analysis, and budgeting)**
- **Mock Reviews**
- **Balancing Personal and Professional Life**
- **Policy Issues**

Applicants accepted to participate in the Institute will receive an expense-paid trip to Pittsburgh, sponsored in part by a grant from the National Institute of Mental Health (R13MH069748); by the Department of Psychiatry, University of Pittsburgh and the Western Psychiatric Institute and Clinic; and by the Department of Psychiatry and Behavioral Sciences, Stanford University.

Applicants to the program should have an M.D. and/or Ph.D. degree and be in the final year of residency, or at the advanced post-doc or junior faculty level of their career trajectory with less than five years as faculty. Applicants should also possess an interest in mental health research. To be considered for participation in the Third Annual Career Development Institute, please submit, via US or Express mail, a curriculum vitae (CV), one letter of support and a brief abstract outlining your interest in mental health research as well as your research career goals.

Please send your application to:

Neil DeWeese
CDI Coordinator
Western Psychiatric Institute & Clinic
3811 O'Hara Street; Suite E-1130
Pittsburgh, PA 15213

Inquiries about the Institute can be sent to: deweese@upmc.edu. Application information must be received no later than January 15, 2004. You will be informed of your selection status by February 2, 2004.

From the Council on Research

Presented below is the third in a series of four articles on models of research training in psychiatry residency programs. All four models were originally addressed at the NIMH-APA Workshop on Research Training for Psychiatrists, November 7, 2001.



Research Training: The Columbia Model

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As part of the *PRR* series on models of research training, I will describe our research training programs at Columbia. The prior contributions in this series have been authored by those being trained in research. This article is written from the Research Training Director's perspective, and focuses on the aims and process of research. I have organized it along a journalist's rules: who, what, when, where, why, although the order is somewhat modified. I also have provided some data on the results of the research training programs that are under my direction. Unfortunately, little such data are available to potential research fellows who are considering research training and who wonder about the likelihood of developing a successful research career.

Where? Columbia University's Health Science Campus is in northern Manhattan, at 168th Street, at the medical center complex that includes the Presbyterian Hospital portion of New York Presbyterian Hospital (NYPH) and the New York State Psychiatric Institute (NYSPI). NYSPI is a New York State-funded institute that functions both as locus for many basic research and clinical research laboratories, and as a clinical facility providing inpatient and outpatient care for community and research patients. Professional employees of NYSPI, including researchers, research fellows and residents, are all members of the Department of Psychiatry at Columbia. Other members of the Department are paid by Columbia University or Presbyterian Hospital. In other words the three institutions - - Columbia University, NYSPI and NYPH - - are interdigitated and collaborative. For example, the extensive neuroscience laboratories that comprise the Center for Neurobiology and Behavior of Columbia University and the

Howard Hughes Institute, directed by Eric Kandel, M.D., are mostly located in the New York State Psychiatric Institute, though Dr. Kandel is a University Professor at Columbia. When combined, the federal and foundation funds coming through Columbia and NYSPI to support research in the Department of Psychiatry amount to approximately \$80 million per year. In addition, approximately \$30 million is allocated annually by New York State as the budget for NYSPI. This level of funding for research in our Department is greater than such funding for most medical schools and makes our Department one where research is a primary mission.

This well-funded and diverse environment is quite ideal for research training as well as for conducting research. The "hard money" support for senior faculty at NYSPI helps support their role as mentors for fellows and junior faculty. The Department of Psychiatry has nine separately funded NIH T32 Institutional Research Training Programs in the following areas:

- a) Affective, Anxiety, Eating and Related Disorders
- b) Schizophrenia
- c) Substance Abuse
- d) Child Psychiatry
- e) Geriatric Psychiatry
- f) Psychiatric Epidemiology
- g) Psychobiology
- h) Neurobiology
- i) Psychiatric Aspects of HIV Infection

Some are administered in combination with other components of Columbia such as the School of Public Health. As Vice Chair for Education I have an oversight role for all these programs, but I am Program Director for the first two of these

fellowships, and it is these that have most frequently attracted *psychiatrists* who wish to obtain research training.

We usually combine the NIMH T32 stipends with additional New York State support for research fellows. We are able to supplement the stipends of M.D.'s so that they receive between \$72,000 and \$80,000 per year. We fund them fully at that level for the first two years and give them the NIMH stipend only in the third year, if they are proceeding successfully, asking that they or their mentors obtain additional support for stipend supplementation. We have also frequently supported fellows for a fourth year from Departmental funds, perhaps with the fellows' own grants, especially if they are awaiting the results of a re-submission for a K Award application that had a promising priority score.

Who should we train and why? There are currently substantial research programs in many departments of psychiatry nationwide. Figures from a few years ago put psychiatry only under internal medicine in the list of the highest recipients of NIH funding — above, for example, departments of pediatrics and pathology. However, much of this research is being done by non-psychiatrists. Researchers from other disciplines working in the departments of psychiatry, especially Ph.D. neuroscientists and Ph.D. psychologists, receive these awards. It is useful to ask whether it makes much sense to train psychiatrists in research, if there are available investigators from these other disciplines in which research training is a more integral part of their education. The answer relates to what type of research needs to be conducted. The Ph.D. neuroscientists, though adept at examining the structure and function of the nervous system and its relationship to

behavior with rodents in laboratory settings, are not prepared to conduct studies of patients with psychiatric disorders. Psychologists, on the other hand, are often quite adept at doing human studies but usually lack extensive training in the pharmacological realm and may not direct their research into biological mechanisms. One obvious source of talented clinician-researchers would be M.D./Ph.D.'s, especially those who have obtained psychiatric residency training. Though departments of psychiatry have welcomed such individuals, and NIMH has supported their training, at the present time it would be unwise to rely on this source for our research manpower needs in that it is such a small pool. I have been unable to find out the exact number of such individuals who enter residency training in psychiatry each year, but extrapolating from the number applying for our own residency, I believe that it is in the range of 20-30 individuals.

Thus we must design research training programs for those M.D.'s who have completed psychiatric residency training, perhaps having some experience in research but usually not a multi-year experience involving the design, execution and publication of a substantial research protocol. Approximately 1,000 M.D.'s finish psychiatric residency training in any year, so the available pool is quite large. The number entering research training is a function of the number of available positions, the level of funding for those positions, and the attractiveness of a research career versus competing opportunities. It is impossible for me to estimate how many applicants might be attracted to research training, but I know that currently, even for well-funded programs such as ours, there are only a few individuals who decide to choose research over the perhaps safer avenues that include subspecialties with official board recognition.

What are the products of our research training? The goals of research training have not been specified in the way that, for example, the Residency Review Committee (RRC) demands definition for the goals of clinical training. However, one way to infer aims is to examine the product. The available data are from an analysis of all psychiatrists who trained in our fellowship program over a period of ten years, 1989-1998, and thus have been graduated from the fellowship long enough to provide some data regarding outcome. More is said

Table 1
Types of Research Pursued by Successful Psychiatrist Graduates of Columbia University Research Fellowships in Schizophrenia and Affective Disorders, Entering 1989-1998

Degree	Total "Successful"	Clinical Research (%)	Clinical Neuroscientist (%)	Laboratory Research (%)
MD/PhD	10	2 (20)	4 (40)	4 (40)
MD	19	4 (21)	15 (79)	0
Totals	29	6 (21)	19 (65)	4 (14)

about this group below, but Table 1 indicates the number of those who successfully developed research careers. Some of the M.D./Ph.D.'s went back to the laboratory and have continued their laboratory-based work in ways very similar to their work before obtaining clinical training. Similarly, some of the M.D.'s, and some of the M.D./Ph.D.'s are listed in the "clinical" outcome column. This is the group of psychiatrists who continue in what has been in the past the most typical research role for psychiatrists, namely conducting clinical trials and/or studying the phenomenology and outcome of clinical disorders. In the middle, which is decidedly the largest group, are those termed "Clinical Neuroscientists." It is this outcome that I wish to describe further.

The clinical neuroscientist usually does psychobiological studies of a specific condition, for example, OCD, schizophrenia, ADHD, etc., to develop greater understanding of the etiology and pathophysiology of the disorder. To recruit subjects, as well as to examine differences between the ill and well states, such psychobiological studies are usually conducted in conjunction with treatment trials. Thus, there are four sets of skills that are necessary for such investigators:

a) *Clinical Skills.* Expertise is needed in assessment: the phenomenology, diagnosis, clinical subtypes, comorbidities and developmental course of the disorder. Pharmacological expertise is necessary regarding the variety of useful medications, alone and in combination, with knowledge about side effects, drug-drug interactions and proposed mechanisms of action of these drugs. Psychotherapeutic expertise is

often necessary to conduct treatment trials with a psychotherapy arm, usually expertise in one or more of the evidence-based brief therapies.

b) *Clinical Trial Skills.* There are a variety of skills that are necessary, and the list would certainly include knowledge about research design, arranging collaborations, constructing protocols and obtaining IRB consent, recruiting patients, issues of measurement, the conduct of a treatment study involving double-blind and placebo elements, supervising those who treat patients, administration of other study personnel, data recording, data analysis, and proper interpretation of the data, especially generalizability. Additional skills regarding data interpretation and manuscript preparation are listed in "d" below.

c) *Laboratory Skills.* Various types of laboratory investigations might be performed. The most common at Columbia, currently, is some type of brain imaging study. It would be impossible to list all the necessary skills of each type of laboratory investigation or even each type of imaging study. However, to illustrate, I list some of those skills important in conducting a PET study: radioligand development, including biochemical derivation and animal/safety testing; understanding workings of the camera and associated equipment that record the emitted radioactivity; patient procedures such as arterial lines for the administration and sampling of the radioligand and any other administered compounds, as well as the distribution of these compounds; biochemical analysis of drugs adminis-

(continued on next page)

tered; dynamic modeling of the drug-receptor interactions; analysis of the images including recognizing artifacts and co-registering the images on MRI images for location; and statistical comparison procedures allowing for the analysis of group data.

- d) *Translational Skills.* The last stage in such a set of experiments is to integrate the clinical and laboratory data sets. This involves interpretation of any associations between laboratory and clinical measures, and sophisticated statistical analysis to examine whether the relationship can be explained by other variables. All associations need to be related to the large, growing human and animal literature on the relationship of brain and behavior in order to propose or evaluate models of the development of the disease in question. And then, of course, the trainee must master the skill of writing up such experiments for publication and presentation to scientific audiences.

How, how long, and where to train? I have tried in the above to illustrate the very large skill set that a clinical neuroscientist needs to conduct translational research. I did not do so to discourage those who are considering such a career but rather to provide a basis for thinking about how such extensive training could be conducted. The major conclusion I draw is that such training takes many years, about five to ten for most people. In other words, research training, which is often thought to be something that could be accomplished in two years, takes much longer, at least if doing translational research is the goal. This means that traditional research fellowship training, two to three years in duration, falls far short of the mark unless it is joined with a longer period of training supported, for example, by a K Award. This has led us at Columbia to strongly encourage fellows to focus on the goal of obtaining a K Award. It is something that we emphasize from the very beginning of the fellowship.

We emphasize to fellows the necessity of developing a broad range of skills, and to do that it is often necessary to have multiple mentors rather than a single mentor. We found this not to be too difficult to arrange since senior researchers often have both clinical and laboratory researchers in their departments, and in general there are well-established lines of collaborations among senior investigators

along which the fellow moves in order to gather skills in different areas. There are many reasons to think it might be advantageous for fellows to learn the different skill sets in sequence. However, the realities of obtaining a K Award have led us to do otherwise. Successful K Award applications usually build on the development of skills that are already becoming established. In other words, it would be unusual for a brain imaging K Award to be awarded to someone who had spent the first two years of the fellowship learning to do clinical trials. Therefore, it is necessary for fellows to begin the development of many research skills almost simultaneously in the fellowship, rather than sequentially.

The data set mentioned above allowed us to review the outcomes for psychiatrist research fellows trained over a ten-year period, to review how successful we ourselves have been. The results are in Table 2 for the 42 psychiatrists who entered training. We have taken K Awards as a mark of successful fellowship experience, and we would add as successful those graduates who are continuing in full-time psychiatric research supported through other mechanisms (three for example being paid on NYSPI lines to conduct their research). The training outcomes are virtually identical across those categories

that one might presume would make a difference in success rates, for example, gender, minority status, or having done a psychiatric residency at Columbia before entering the fellowship. The one difference that might be significant is the K Award success rate of M.D./Ph.D.'s versus M.D.'s: 69 percent versus 34 percent. However, as Table 2 shows, when we take into account those who have successfully found other routes to becoming a full-time researcher, the difference is not substantial.

The average length of the fellowship in our program was 2.8 years for the 42 graduates. In other words, most fellows completed three years of training, some two years, and some were supported for four years. Providing four years of support is difficult, since the NRSA lines that comprise the T32 awards require special permission from the NIMH institute director to extend post-graduate training beyond three years. I have encouraged the NIMH administrators to approve such requests because this extra year of support can allow an excellent developing researcher to re-submit and obtain a K Award. We certainly do not want to lose promising researchers who have already committed themselves to psychiatric research and are in the midst of their learning experience.

Table 2
Career Outcomes for Psychiatrists in Columbia University
Research Fellowships in Schizophrenia and Affective
Disorders, Entering 1989-1998

	N	K Award (%)	"Successful" (%)
Totals	42	19 (45)	29 (69)
MD/PhD	13	9 (69)	10 (77)
MD	29	10 (34)	19 (66)
Women	15	8 (53)	10 (67)
Men	27	11 (41)	19 (70)
Minorities	6	3 (50)	4 (67)
Non-Minorities	36	16 (44)	25 (69)
Columbia Residency	24	12 (50)	20 (83)
Non-Columbia Residency	18	7 (39)	9 (50)

Conclusions. There are four “models” of psychiatric research training that are being presented in these *PRR* reports, Columbia, Michigan, Pittsburgh and Yale, but I think there are many similarities across the four sites. Each program recognizes that the training process needs to last a long time and thus it is necessary to provide consistent support. We at Columbia emphasize research training in the later years of the residency and after that for as many years of fellowship training as it takes to obtain the necessary training and independent funding.

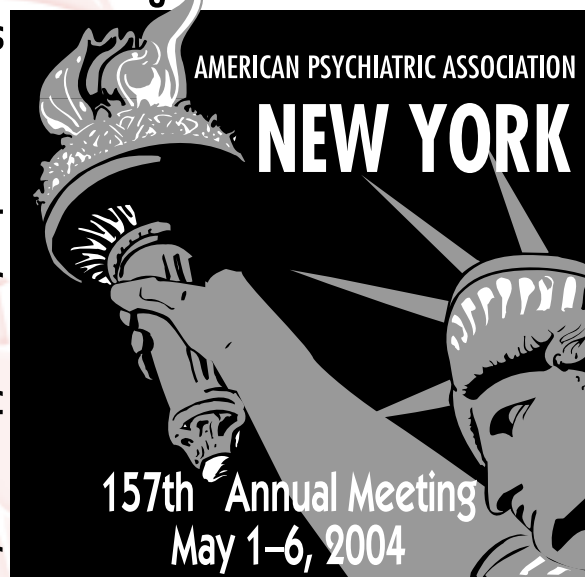
Our principles are the following:

- 1) Have a clear focus on the goals of research training and the skill sets necessary to become a clinical neuroscientist.
- 2) Be honest with fellows about the necessary elements of such a career, including the necessity early in the fellowship training to gain a wide variety of skills through multiple mentors and simultaneously write a K Award application to provide for advanced training.
- 3) Take as our responsibility funding fellows at a livable wage and finding ways to continue to fund them beyond the usual two- or three-year fellowships, if they are showing the commitment and promise that indicate success. ■



Dissolving the Mind-Brain Barrier

Psychotherapy and Psychopharmacology:



From the Council on Research

Presented below is the fourth in a series of articles on models of psychiatry research training programs. All four models were originally addressed at the NIMH-APA Workshop on Research Training for Psychiatrists, November 7, 2001. A list of models included in the series is provided at the conclusion of this article.

Neuroscience Based Research Training The Yale Model – Medical Students

George R. Heninger, M.D. and Tracey A. Cho, M.D.
Yale University School of Medicine

Neuroscience and Psychiatry

There is an array of training programs at Yale designed to attract and engage medical students, graduate students, postdoctoral fellows and psychiatric residents in translational neuroscience research careers. With this training they will be able to apply the knowledge from basic neuroscience research to clinical problems in psychiatry.

Advances from neuroscience research now make it possible to discover the biologic causes and pathogenesis of many psychiatric illnesses. Only by understanding the neurobiologic substrate of illness can we make real progress in understanding the complex relationships between the neurobiologic vulnerabilities and the environmental and social factors that precipitate, modify, and structure symptom expression. Future clinical mental health research scientists will need to be well educated in the basic and clinical neurosciences and in addition also have the necessary skills and abilities to apply this knowledge to understanding the pathogenesis of illness and treatment of psychiatric patients.

There is good reason to be optimistic, since advances from neuroscience research now make it realistically possible to discover the biologic causes and pathogenesis of many psychiatric illnesses. This in turn will provide the major avenues for developing improved treatment, prevention of illness, and cure of patients.

Neuroscience at Yale

Yale University supports a large, active and productive neuroscience research community. There are 14 departments located within the University and their neuroscience research programs generate over one-half of the biomedical research budget. In addition to the graduate

programs within each department, there is an Interdepartmental Neuroscience Research Program that includes 82 faculty located throughout the University. The broad spectrum of neuroscience research provides a strong support base for clinical neuroscience research in psychiatry.

Neuroscience Training in Psychiatry

The Department of Psychiatry has a long and productive history in training graduate students and psychiatric residents in neuroscience research. The Biological Sciences Training Program in Psychiatry, a NIMH supported program initiated in 1957, has supported postgraduate training for both Ph.D.'s and psychiatrists in neuroscience and psychiatry research for over 46 years.

The Clinical Neuroscience Training Program in Psychiatry, an NIMH funded program initiated in 1996, is specifically targeted to support psychiatrists who are starting their research careers during the later part of their psychiatry residency training. In addition, there are graduate training programs in Neuroimaging, Stress Disorders, Addiction Psychiatry and Smoking, Woman's Behavioral Health, Consultation Psychiatry, Geriatric Psychiatry and individual fellowships that also provide training in Clinical Neuroscience Research.

Each of these programs has a specific focus of research that the trainee participates in. In addition, there is a large and rich matrix of courses, seminars, grand rounds and other educational activities that trainees take advantage of. This matrix of support for neuroscience research at the postdoctoral level, has been very productive. There has been less support, however, for medical students. In order to fill this gap we have instituted a NIMH supported program designed to attract and prepare

medical students for a neuroscience based research career in psychiatry.

Medical Students and Clinical Neuroscience Research Careers

Currently at the Yale Medical School (and we suspect the problem also exists at other schools) there is a need for a more intensive and organized integration of basic neurobiology with clinical psychiatry. Very few Yale medical students go into psychiatric training and less than one student every three years enters into clinical neuroscience research in psychiatry. In contrast, a very large percent of each class enter research careers in other clinical and basic science areas. For example, there are 20 students each year who work in laboratories at Yale conducting cancer research. As a consequence, there is a large gap between the extensive body of neurobiologic knowledge available to be presented to the students and the number of students who are actually engaged in applying this knowledge to the study of psychiatric illness.

In the past, a large body of neuroscience information was presented in the curriculum for first and second year medical students, but only occasionally (depending on a particular faculty member) was the information clearly related to clinical psychiatry. There was a clear need for a systematic approach in relating neuroscience to psychiatry.

In response, we have constructed a curriculum that digests, organizes, and presents this vast array of available information to medical students in such a way that its relevance to psychiatry is clear. This program fills the gap with a curriculum in the "Biology of Behavior" for first year medical students and a curriculum in the "Neurobiology of Behavioral Disorders" for the second year medical students.

Currently, the program has two components designed to attract and engage medical students in translational clinical neuroscience research careers.

1. A modern, internet based didactic curriculum which interrelates basic and clinical neuroscience with clinical psychiatry.
2. A structured and mentored clinical neuroscience research training experience where students are able to engage in a 3- or 12-month "real world" research experience.

A Neuroscience Based Curriculum

The curriculum for medical students is specifically designed to integrate basic, clinical, and neuroscience disciplines with a focus on understanding psychiatric illness; the curriculum is integrated within the first and second year courses. As a part of the lectures and small group activities, case reports, live interviews, and video clips are used to illustrate the clinical relevance of each aspect of basic neuroscience.

A Digitized Learning System on the Internet

A unique and novel aspect of the curriculum is the development and use of an extensive interactive, digital, electronic syllabus available on the Yale intranet for all students. It covers all facets of the curriculum: full text journal articles with access to abstracts of references and additional readings; graphics, animation, videotaped patient presentations; as well as opportunities for self-study and self-evaluation. Each year aspects of this curriculum are presented in an interactive lecture format to 200 first and second year medical students.

Many students complain of the lecture format and often prefer to learn at their own pace, studying text books and other materials. Indeed, attendance at lectures at some times of the year can be as low as 30 percent. The students are now able to access the course information and additional information on a local intranet where they are also able to test themselves for their level of knowledge. The anonymous test results are available to the instructor for further feedback and guidance.

The "electronic syllabus" developed in this project complements and extends the initiative taken in the standard lecture and small group format used to teach the first and second year medical students about

neurobiology and psychiatry. The centralization and availability of the course material assist the faculty in their lecture presentations. Most importantly, we will be able to explore the effectiveness of this new medium for medical student self-education on this particular topic. If this is found to be a successful approach, the method then can be used in other medical schools.

The topics and clinical examples used for the first and second year medical school courses are listed in Table I and Table II.

Clinical Research Experience

As the first and second year medical students proceed through the curriculum, they take the next step of actually evaluating and committing to careers in clinical neuroscience research. We have provided

financial support for each medical student to spend a 3- or 12-month block of time in clinical research after the first, second or third year of medical school. Students actually participate in a structured mentored clinical neuroscience research experience. This allows them to experience first hand the rewarding aspects of this type of work and helps them to engage in research activity.

The research experience involves the student in choosing a topic and an advisor who will sponsor the research. The student then conducts a background literature review, formulates a research question, and designs a study under the advisor's guidance. The study is then conducted, the results analyzed and written up for possible publication.

(continued on next page)

**Table I
1st Year Curriculum
Neurobiology of Behavior**

Neurobiologic Topic	Clinical Example
Neural Mechanisms of Learning	Dyslexia
Biologic Mechanisms of Memory	Alzheimer's Disease
Neural Mechanisms of Attention	Attention Deficit Hyperactivity
Arousal and Sleep	Narcolepsy
Integration of Higher Cortical Functions	Schizophrenia
CNS Regulation of the Stress Response	PTSD
Neural Circuits of Fear and Anxiety	Panic Disorder
Mechanisms of Motivation and Reward	Drug Abuse
Regulation of Eating Behavior	Anorexia Nervosa
Neurobiology of Mood	Depression
Effects of Sex Hormones on Behavior	Premenstrual Tension
Genes of Behavior	Downs' Syndrome; Fragile X

**Table II
2nd Year Curriculum
Neurobiology of Behavioral Abnormalities**

Introduction, Neuropharmacology in Neurology and Psychiatry	Neurobiology & Symptoms in Behavioral Disorders
Neurobiology & Behavior of Psychotomimetic Drugs	Neurobiology of Psychosis-Schizophrenia
Antipsychotic Drugs	Neurobiology of Affective Disorders
Antidepressant Drugs	The Biology of Suicide
Neurobiology of Anxiety Disorders	Neurobiology of Stress & PTSD
Antianxiety Drug Treatments	Clinical Abnormalities of Sleep & Arousal
Description, Classification & Biologic Aspects of Personality Disorders	Neurobiology of Substance Abuse, Opiates & Cocaine
Neurobiology of Substance Abuse, Nicotine & Alcohol	Clinical Phenomenology and Biology of Eating Disorders

There is also a more advanced curriculum for trainees participating in the clinical research training experience. This curriculum also relates basic neuroscience to clinical psychiatry but, in addition, it covers more advanced topics such as ethics of research with psychiatric patients, research design, protocol construction, protocol management, data analysis and statistics, and report writing. The trainee is introduced to specific ethical and social issues as well as to specific clinical assessment and evaluation methods involved in clinical neuroscience research with psychiatric patients. A major focus is on the conceptual and practical bridges between basic and clinical neuroscience and on actual studies with psychiatric patients.

The curriculum and mentored clinical research experiences are specifically tailored to the education level of the participants. The entire program has built-in methods for evaluation with yearly followup.

Example of a One-Year Clinical Neuroscience Research Experience

One of the authors (Dr. Cho) conducted a one-year research study between his third and fourth year of medical school, as described below.

Title: Effects of Military Training Stress on Immune Function in Healthy Military Personnel

Background: Military personnel going through the severe stress of the army special forces Survival, Evasion, Resistance and Escape School (SERES) have shown robust stress induced changes in measures of neuroendocrine responsiveness, level of dissociation and performance. In addition, there are differences in the stress response among personnel coming from different military units.

Research Questions: Since stress is known to affect immune function, the following questions were generated.

During the stress of SERES:

1. What aspects of immune function are affected?
2. What are the clinical correlates of changes in immune function?
3. Do changes in immune function relate to changes in neuroendocrine function, dissociation or performance?

Study: Measures of immune function, neuroendocrine variables, dissociation scales, and performance were obtained in military personnel before, during, and after their performance in SERES.

Results: The study has been completed and the data analyzed. Dr. Cho has presented this research at national meetings and has prepared a manuscript for publication.

Research Training Received: Dr. Cho had weekly meetings with his advisor and was involved in sample collection, laboratory assays, statistical analysis and research conferences. He also attended many research seminars, teaching conferences and national scientific meetings.

In addition to the research training in designing and conducting the study, Dr. Cho was exposed to other educational issues: ethical issues; logistical issues such as ordering supplies and subject recruitment; and social and interpersonal issues, such as collaborations and presenting results at scientific meetings.

The research year has been an invaluable experience in Dr. Cho's career planning and development. He learned how to conduct research from the formulation of a question to the collection of data and finally to the presentation of the research to peers. More importantly, it exposed him to the culture of medical research and taught him about the balance between clinical, scientific, social and administrative functions.

Summary

We have developed a neuroscience based research training model in order to interest medical students in a career of translational clinical neuroscience research. This includes:

1. Effectively demonstrating the clinical neuroscience point of view in the curriculum for first and second year medical students.
2. Providing support for medical students to obtain a three-month or one-year experience conducting clinical neuroscience research.
3. Integrating the medical student program with the Clinical Neuroscience Research Training Program for psychiatry residents which leads to a career as an independent investigator.

This program is now in its fourth year and has been functioning very well. As students pass through this program they will be better prepared for postgraduate training in research either at Yale or other institutions. ■

Following are citations for the four articles on model research training programs that have appeared in this series.

Robert McCullumsmith, Training the Next Generation of Biological Psychiatrists: The Michigan Model. *Psychiatric Research Report*, Summer 2002, Vol. 18, No. 2, pp 6-7.

Holly A. Swartz and Raymond Y. Cho, Building Bridges: The Pittsburgh Model of Research Career Development. *Psychiatric Research Report*, Fall 2002, Vol. 18, No. 3, pp. 8-9.

Ronald O. Rieder, Research Training: The Columbia Model. *Psychiatric Research Report*, Winter 2003, Vol. 19, No. 1, pp 4-7.

George R. Heninger, and Tracey A. Cho, Neuroscience Based Research Training: The Yale Model - Medical Students. *Psychiatric Research Report*, Summer 2003, Vol. 19, No. 3, pp 3-5.

Editorial Note: This article is the last of four model programs that were presented at the November 7, 2001, NIMH/APA Workshop on Research Training for Psychiatrists. A year ago, in the Summer 2002 issue of the PRR, we introduced the series by saying "each program will be presented here in a series of articles that we hope will begin a continuing survey focused on research training in its various shapes and sizes within psychiatry residency programs throughout the United States."

At this time we would like to invite the field to submit descriptions of other psychiatry research training efforts for presentation in successive future issues of the Psychiatric Research Report. Descriptions may be of small, individual efforts; pilot or experimental programs; well-established programs; formal or informal efforts; individually-designed or department-wide curricula; pre-med, med, residency, or post-doctoral training. We would like to know, and we would like others to know, what is out there and how existing examples of research training might be applied or adapted in the national effort to train and produce a greater number of physician scientists interested in the issues of mental health and mental illness. Please submit ideas, abstracts, or full-fledged articles by e-mail to prp@psych.org. Articles appearing in other forums (journals, newsletters, academic formats) would gladly be reprinted in the PRR newsletter, with permission from the authors and originating publications.

Research Training Opportunities

■ **SPONSOR:** American Psychiatric Association (APA)

■ **POSITION:** PMRTP Travel Awards

DESCRIPTION: The NIMH funded Program for Minority Research Training in Psychiatry (PMRTP) is designed to increase the number of minorities in the field of psychiatric research. The PMRTP sponsors training of minority medical students, psychiatric residents, and post-residency fellows. Emphasis is on minority groups underrepresented in medicine. Nominations are requested for minority trainees to attend the upcoming 156th Annual Meeting of the APA, which will take place from May 2-6, 2004 in New York City. Pending availability of funding, the PMRTP proposes to fund up to 15 underrepresented minority "mini-fellows" (medical students or general and child psychiatric residents) to attend the meeting. The awards will provide trainees with the opportunity to participate in the meeting, to talk with senior researchers and peers, and to learn about potential fellowships. The award covers the following expenses for each mini-fellow: • travel to and from the meeting; • hotel accommodations for up to five nights.

Submissions should include: a two-page nomination form; the nominee's CV; a brief statement from the nominee about his/her research interests and plans for developing a career in psychiatric research; a letter of recommendation from the chairperson of the department of psychiatry, training director, director of medical student education, or the nominee's research mentor.

DEADLINE: February 20, 2004

CONTACT: Ernesto Guerra, Director of Research Training Programs, APA, 1000 Wilson Blvd., Suite 1825, Rosslyn, VA 22209-3901; eguerra@psych.org; 703-907-8622.

■ **SPONSOR:** Robert Wood Johnson Foundation (RWJF)

■ **POSITION:** RWJ Clinical Scholars Program - 2004

DESCRIPTION: This program is designed to enable young physicians committed to clinical medicine to acquire new skills and training in the quantitative and qualitative sciences underlying health services research. The program offers two years of graduate-level study and research, as part of a university-based postresidency training program, in priority areas designated by the participating institutions. In the program's newest iteration, there will be an additional emphasis on community-based research and leadership training. The goal is the integration of Scholars' previous clinical training with those of program development and research methodology to find solutions for issues in community intervention and health services research. Up to one-half of scholars in the cohort entering in 2005 will be eligible for a third year, as well as the subsequent opportunity to apply for a career development award. For 2004, the participating institutions will be UCLA, Yale University, University of Michigan, and University of Pennsylvania. Although these programs vary in design and emphasis, each institution has developed core programs to introduce scholars to

the basic disciplines and methods used in health care research. The national program is administered by Stanford University. The program is open to U.S. citizens training in any of the medical/surgical specialty fields, including psychiatry, pediatrics, obstetrics/gynecology, and family medicine.

DEADLINE: Program brochures will be available January 2004; applications due February/March 2004 with interviews to follow; notification to successful candidates, June – July, 2004; appointments begin July 2005. Please see the program Web site for the latest information: <http://rwjersp.stanford.edu>.

CONTACT: Iris F. Litt, M.D., Stanford University School of Medicine, RWJ Clinical Scholars Program, 30 Alta Road, Stanford, CA 94305; (650) 566-2337, fax: (650) 566-2340, e-mail: iris.litt@stanford.edu.

■ **SPONSOR:** Stanford University School of Medicine

■ **POSITION:** Postdoctoral Research/Clinical Fellowship in Pediatric Bipolar Disorders

DESCRIPTION: The Division of Child and Adolescent Psychiatry is offering a one to two year clinical and research postdoctoral fellowship in Pediatric Bipolar Disorders. The research portion provides participation in ongoing studies of neurobiology, genetics, and phenomenology of early-onset bipolar disorders as well as development of a clinical treatment outcomes research program. The clinical portion provides the opportunity for advanced clinical training in child and adolescent psychology, concentrating on mood disorders, and involves conduct of initial evaluations, ongoing treatment, and psychological testing. Candidates should be Ph.D. psychologists with research backgrounds who are eligible for clinical licensure in California. Stanford is an equal opportunity employer. Minority and women candidates are encouraged to apply.

DEADLINE: February 1, 2004

CONTACT: Interested applicants should send a CV, cover letter, and three sealed letters of recommendation to Kiki Chang, M.D., Director, Pediatric Bipolar Disorders Program, 401 Quarry Road, Stanford University School of Medicine, Stanford, CA 94035-5719, or for more information, e-mail kchang88@stanford.edu.

■ **SPONSOR:** Stanford University School of Medicine

■ **POSITION:** Research Fellowship in Mood, Eating, or Anxiety Disorders

DESCRIPTION: Stanford University's Department of Psychiatry and Behavioral Sciences is accepting applications for a two-year NIMH-funded research fellowship in mood, eating, or anxiety disorders. The fellowship is designed for either 1) psychiatrists or behavioral neurologists who have recently completed residency

(continued on next page)

and/or 2) those who recently completed a Ph.D. in clinical psychology. U.S. citizenship or permanent resident visa status required. Applicants from underrepresented groups and from all ethnic backgrounds are encouraged to apply.

DEADLINE: February 1, 2004 for positions beginning in June and in September 2004.

CONTACT: Alan F. Schatzberg, M.D., Department of Psychiatry and Behavioral Sciences, School of Medicine, Stanford University, 401 Quarry Road, Stanford, CA 94305-5717, (650) 723-6881, afschatz@stanford.edu.

■ **SPONSOR:** University of Iowa

■ **POSITION:** Postdoctoral Fellowships in Clinical Neuroscience

DESCRIPTION: The Mental Health Clinical Research Center is accepting applications for a one-to-three year NIMH-funded fellowship program in the neurobiology of major psychotic disorders. The fellowship is designed for either: 1) psychiatrists who have recently completed residency or are beginning their fourth year of residency and/or; 2) people who have recently completed Ph.D.s in psychology (clinical or experimental), neuroscience, biostatistics, biomedical engineering, or related fields. Major areas of activity include brain imaging (MRI, fMRI, & PET), biostatistics, cognitive neuroscience, neuroanatomy and neuropathology, neuropharmacology, and molecular genetics. The primary focus of the Clinical Research Center is on schizophrenia and related psychotic disorders. U.S. citizenship or permanent visa status required. Applicants from underrepresented groups and from all ethnic backgrounds are encouraged to apply. The University of Iowa is an Equal Opportunity/Affirmative Action Employer. For more information about the Mental Health Clinical Research Center, visit our Web site at <http://iowa-mhrc.psychiatry.uiowa.edu/>.

DEADLINE: Applications now available for positions beginning July 1, 2004.

CONTACT: For applications write to Nancy C. Andreasen, M.D., Ph.D., Director, MHCRC, 2911 JPP, 200 Hawkins Drive, Iowa City, IA, 52242-1057, (319) 356-1545 or e-mail Vicki Foubert at vicki-foubert@uiowa.edu.

■ **SPONSOR:** University of Massachusetts Medical School

■ **POSITION:** Psychopharmacology Fellowship

DESCRIPTION: The Psychopharmacology Program offers a full-time, one-year PGY5 research fellowship position beginning July 1, 2004. Fellows will participate in clinical research in affective and psychotic disorders, have a project of their own under the supervision of Dr. Anthony Rothschild and will also participate in ongoing psychopharmacology research projects in the Department of Psychiatry. Fellows will have 100% protected research time and opportunities to travel and present at meetings. Candidates must have completed an approved residency in psychiatry. University of

Massachusetts is an Affirmative Action /Equal Opportunity Employer.

DEADLINE: Open

CONTACT: Please send CV and two letters of recommendation to Anthony J. Rothschild, M.D., Professor and Director of Clinical Research, Department of Psychiatry, U. Massachusetts Medical School, 361 Plantation Street, Worcester, MA 01605 or e-mail rothscha@ummhc.org. Web site: www.umassmed.edu/psychopharm.

■ **SPONSOR:** Washington University, St. Louis

■ **POSITION:** Neuroimaging/Neuropsychiatry Fellowship

DESCRIPTION: A one-to two-year, NIH-funded fellowship position is available. The fellow will participate in patient care and neuroimaging research, with the latter predominating. Clinical training will focus on the neuropsychiatry of movement disorders. Ongoing studies in the laboratory include functional MRI and PET with pharmacologic challenges in human patients and other primates. A goal of the program is to help the fellow prepare to write a successful KO8 or K23 application. Candidates must be BE/BC in psychiatry and licensed to practice medicine in the U.S. For further information, www.purl.org/net/kbmd/research.htm.

DEADLINE: Applications will be accepted until the position is filled.

CONTACT: To apply, send CV and a brief description of career goals to Kevin J. Black, M.D., Kevin@wustl.edu.

■ **SPONSOR:** Yale University School of Medicine

■ **POSITION:** Clinical Neuroscience Research Training

DESCRIPTION: The Department of Psychiatry offers a unique opportunity for PGY4 residents and PGY5 fellows interested in cutting-edge clinical neuroscience research. Emphasis is on the biologic basis of neuropsychiatric disorders. Trainees are encouraged to develop their own research studies in one or more of the following areas: novel psychopharmacology, brain imaging research (PET, SPECT, 1H-MRS, fMRI) pharmacologic challenge paradigms, and genetics of psychiatric disorders. Neuroscience faculty have extensive expertise in the areas of schizophrenia, mood disorders, substance abuse (alcohol, cocaine, nicotine) and women's reproductive behavioral health research. Faculty closely mentor trainees to enhance research training and promote trainees' career development.

DEADLINE: Open

CONTACT: Interested applicants should send their curriculum vitae to Robert Malison, M.D., Director, Neuroscience Research Training Program, Yale University Department of Psychiatry, Clinical Neuroscience Research Unit, Connecticut Mental Health Center, 34 Park Street, New Haven, CT 06519, or send an e-mail requesting more information to robert.malison@yale.edu. ■



Department of Veterans Affairs

Special Fellowship Program in Advanced Psychiatry

The Office of Academic Affiliations, Department of Veterans Affairs (VA), announces its two-year, post-residency, specialized training program in Advanced Psychiatry. This program is accepting applications for one position at each of eight Fellowship sites to begin July 1, 2004. This is an interdisciplinary program that aims to train psychiatrists to become outstanding clinical researchers in high priority areas of mental health. The program combines individualized, mentored research and clinical training with a state-of-the-art curriculum that emphasizes research methods; statistics; epidemiology; mental health systems; quality improvement methods; education and service delivery. Each site is affiliated with one of the VA Mental Illness Research, Education, and Clinical Centers (MIRECC). The purpose of the MIRECC is to generate new knowledge about the causes and treatments of mental disorders, apply new findings to model clinical programs, and widely disseminate new findings through education to improve the quality of veterans' lives and their daily functioning in their recovering from mental illness. Fellowship sites are linked electronically for didactic, academic, and research efforts. Fellows devote 75% time to research and educational activities and 25% to clinical training. In collaboration with their mentors, Fellows will develop and implement a research project, publish and present findings, participate in grant writing, and utilize the latest technology for educational activities and clinical service delivery. Applicants must have completed ACGME-accredited specialty residency training, be board eligible or board certified, and have an active, unrestricted U.S. license to practice. International medical graduates must also have a current visa and an ECFMG certificate that is valid indefinitely. Applicants on a J-1 visa must also have current ECFMG sponsorship. VA will provide funds for Fellows' stipends. Stipends are based on previously completed ACGME-accredited residency training. To apply for this post-residency Fellowship, contact the Fellowship program director at one of the following eight sites:

Bruce Rounsaville, MD, New Haven, CT – (203)932-5711 x7401 or bruce.rounsaville@yale.edu

Bruce Levine, M.D., Bronx, NY – (718) 584 9000 x5204 or bruce.levine@med.va.gov

Ira Katz, MD, PhD, Philadelphia, PA – (215) 349-8225 or katzi@mail.med.upenn.edu

Paul Ruskin, M.D., Baltimore, MD – (410) 605-7354 or Paul.Ruskin@med.va.gov

Mark Kunik, MD, Houston, TX – (713) 794-8639 or mkunik@bcm.tmc.edu

Elaine Peskind, MD, Seattle, WA – (206) 764-2749 or peskind@u.washington.edu

Jerome Yesavage, MD, Palo Alto, CA – (650) 852-3287 or yesavage@stanford.edu

James Lohr, MD, San Diego, CA – (858) 552-8585 x2261 or jlohr@ucsd.edu

For general information about the program, please contact Quinn Kennedy, PhD, Fellowship Hub Site, at (650) 852-3287 or vamireccfellowship@lists.stanford.edu

The fellowship program follows a policy of selecting the most qualified candidates and is an Equal Opportunity Employer. While a quota system of affirmative action is not used, priority is given to ensuring diversity in our program. Our commitment to diversity includes attempting to ensure an appropriate representation of individuals along many dimensions, including (but not limited to) gender, sexual orientation, age, ethnic/racial minorities, persons with disabilities, and geographical and institutional diversity.

Research Funding Opportunities

■ **SPONSOR: NARSAD**

■ **SUBJECT: Independent Investigator Award**

DESCRIPTION: The National Alliance for Research on Schizophrenia and Depression (NARSAD), a private, not-for-profit organization which raises and distributes funds for scientific research into the causes, cures, treatments, and prevention of severe psychiatric brain disorders, announces award opportunities, up to \$50,000/yr. for two years, open to scientists at the associate professor level with national competitive support as a principal investigator. Basic and or clinical investigators are supported, but research must be relevant to schizophrenia, major affective disorders or other serious mental illnesses.

DEADLINE: Application materials available January 1, 2004, online, www.narsad.org; applications are due March 5, 2004. Earliest award start date is September 15, 2004.

CONTACT: Research Grants Program (516) 829-5576 or grants@narsad.org for more information.

■ **SPONSOR: National Institutes of Health (NIH)**

■ **SUBJECT: Curriculum Development Award in Interdisciplinary Research**

DESCRIPTION: This announcement has been developed as an NIH Roadmap Initiative and includes all NIH institutes and centers. One goal of the Roadmap Initiative is to develop future research teams that can catalyze the integration of multiple disciplines. Because scientific advances are now being made at the interfaces of traditional disciplines, and approaches to science are becoming more integrative, it is necessary to train investigators who can work collectively across traditional disciplinary boundaries to answer scientific questions and achieve specific endpoints. This Request for Applications thus supports the development of innovative courses, curricula and educational approaches designed to train interdisciplinary scientists in emerging areas of biomedical, behavioral and quantitative sciences. The focus is on preparing undergraduate, predoctoral, or postdoctoral candidates, or combinations of these, to conduct research in team settings that are highly interdisciplinary and collaborative. Applications must include multiple departments and may also include multiple centers, schools or institutions. Awardees will be expected to develop and implement the courses or curricula, which in turn are expected to become models transferable to other institutions in whole or in part. Projects may be funded for up to five years; competing renewal applications will not be considered under this announcement (RFA-RM-04-007).

DEADLINES: Letter of Intent, January 27, 2004; Application, February 24, 2004

CONTACT: This RFA is administered by the National Institute of General Medical Sciences (NIGMS) on behalf of the NIH. Contact Alison E. Cole, Ph.D., Division of Pharmacology, Physiology and Biological Chemistry, NIGMS, Building 45,

Room 2AS-49K, Bethesda, MD 20892; (301) 594-3349, fax: (301) 480-2802, e-mail: colea@nigms.nih.gov.

■ **SPONSOR: National Institutes of Health (NIH)**

■ **SUBJECT: Short Programs for Interdisciplinary Research Training**

DESCRIPTION: The NIH is interested in developing a new interdisciplinary research workforce, distinctly different from a multidisciplinary approach. An *interdiscipline* results when two or more disciplines are melded to create a new science: e.g., biophysics, biostatistics, bioengineering, psychoneuroimmunology. The purpose of this announcement is to promote the development of new short interdisciplinary training programs for scientists at all career levels. Creative interdisciplinary approaches to intractable research problems are most likely to evolve if scientists are formally trained in multiple disciplines. This announcement seeks to facilitate intensive training programs to provide students with fundamental understanding of a new discipline that can then be melded with previous training to generate new interdisciplines with novel research strategies. The new training programs to be developed under this announcement should include both didactic and research training in varying ratios. The announcement thus supports 1) Short Laboratory Courses, with a didactic emphasis, and 2) Short-term Research Institutes, with a research emphasis. The RFA will use the R13 award mechanism. Please see Announcement RFA-RM-04-007.

DEADLINES: Letters of Intent, January 14, 2004 and January 14, 2005; Applications, February 11, 2004 and February 11, 2005.

CONTACT: Betsy Wilder, Ph.D., NIDDK, (301) 594-7717, fax: (301) 480-3510, e-mail: ew136e@nih.gov.

■ **SPONSOR: National Institute on Drug Abuse (NIDA)**

■ **SUBJECT: Medications Development for Cannabis-Related Disorder**

DESCRIPTION: NIDA is seeking grant applications focused on the identification, evaluation and development of safe and effective pharmacological treatments for cannabis-related disorders (CRDs) such as cannabis abuse or dependence, cannabis-induced disorders (intoxication, delirium, psychotic and anxiety disorders) and their comorbidity with other medical and psychiatric disorders (depression). There is a special interest in the treatment of children and adolescents. Cannabis use includes marijuana, hashish, and other tetrahydrocannabinol-containing substances. This announcement will support both clinical trials to test potential medications in humans and the preclinical development of new chemical entities for advancement to the clinical development stage. Applications may focus on the pharmacotherapy of cannabis abuse and they may target one or various CRDs or clinical manifestations of the disorder. Three grant mechanisms are applicable to this announcement: RO1 research project, RO3 small grant, and R21 exploratory/developmental.

DEADLINES: February 20, 2004 for Letter of Intent; March 23, 2004 for Applications.

CONTACT: Ivan D. Montoya, M.D., M.P.H., Division of Treatment Research and Development, NIDA, (301) 443-8639, fax: (301) 443-2599, e-mail: imontoya@mail.nih.gov.

■ **SPONSOR:** National Institute on Drug Abuse

■ **SUBJECT:** Prevention Research for the Transition to Adulthood

DESCRIPTION: The period spanning late adolescence and young adulthood (roughly from 18 through 25 years of age) is characterized by various developmental tasks, life changes, and choices; it is also the period when use and abuse of drugs peak. While much attention has been given to initiation of drug use during the transitions that occur during early adolescence, far less research has focused on illicit drug use and abuse during the transition from adolescence to adulthood, the period labeled "emerging adulthood." NIDA thus seeks research grant applications focused on this transitional period that test the efficacy of interventions to prevent and/or reduce drug use, abuse, and related problems including HIV-risk behaviors. Interventions should be based on existing knowledge of the etiology and patterns of drug use and abuse. Studies focusing solely on alcohol use will not be considered. This RFA will use the research project (RO1), the small grant (RO3), and the exploratory/developmental (R21) award mechanisms.

DEADLINES: February 20, 2004 for Letter of Intent; March 23, 2004 for Application

CONTACT: Susan E. Martin, Ph.D., Prevention Research Branch, Division of Epidemiology, Services and Prevention Research, NIDA, (301) 402-1533, fax: (301) 480-2542, e-mail: smartin@nida.nih.gov.

■ **SPONSOR:** National Science Foundation (NSF) and National Institutes of Health (NIH)

■ **SUBJECT:** Collaborative Research in Computational Neuroscience (CRCNS)

DESCRIPTION: The subtitle of this announcement is Innovative Approaches to Science and Engineering Research on Brain Function. The joint initiative is a continuation of NSF 02-018, released in November 2001, but is in effect for three years and

contains an expanded scope in accordance with the interests of the five sponsoring NSF Directorates and the nine participating institutes of the NIH (including NIA, NIAAA, NIDA, and NIMH). The solicitation is designed to encourage new collaborations at the interface between computational modeling and neuroscience for the purpose of analyzing and interpreting increasingly complex neurobiological data sets. The computational research supported under this program must have impact on and relate to biological processes; must be testable in biological studies; and must generate new hypotheses that can help reveal mechanisms underlying both normal and diseased states of the nervous system. It is expected that collaborations will involve a dynamic and possibly protracted period of model development and refinement, and intense interactions among scientists and engineers from different disciplines.

DEADLINES: December 10, 2003, December 1, 2004, December 1, 2005 for Letters of Intent, to be submitted by e-mail to NSF; January 30, 2004, January 5, 2005, January 5, 2006, for Applications, to be submitted to NSF.

CONTACT: For contacts at the NSF Directorates and the NIH Institutes, please see the program solicitation NSF 04-514 on the following Web site: www.nsf.gov/pubs/2004/nsf04514/nsf04514.htm.

■ **SPONSOR:** National Institute of Mental Health

■ **SUBJECT:** Interventions and Practice Research Infrastructure Program

DESCRIPTION: The NIMH seeks to expand the number of partnerships between academic institutions and community-based clinical or service settings in the interest of making evidence-based mental health services available and acceptable for those in need of mental health care. This program announcement will use the resource related research projects award mechanisms (R24). The announcement seeks proposals aimed at narrowing the gap between what is known about treatments for mental illness and what is available and provided to those in the community who need care. A broad definition of community care and of potential partnerships is intended.

DEADLINES: February 1, June 1, October 1

CONTACT: Junius J. Gonzales, M.D., Division of Services and Intervention Research, NIMH, (301) 443-3364, fax: (301) 443-4045, e-mail: jgonzale@mail.nih.gov. ■

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