Training Future Generations of Mental Health Researchers: Devising Strategies for Tough Times

Charles F. Reynolds III, M.D., **Paul A. Pilkonis, Ph.D.**, **David J. Kupfer, M.D.**, **Leslie Dunn, M.S.**, and **Harold A. Pincus, M.D.**
Drs. Reynolds, Pilkonis, Kupfer, and Ms. Dunn are affiliated with the University of Pittsburgh School of Medicine, and the Western Psychiatric Institute and Clinic, Pittsburgh, Pennsylvania. Dr. Pincus is affiliated with the Department of Psychiatry, Columbia University, New York, New York

Abstract

Objective—The authors describe a junior faculty scholars program in a large academic department of psychiatry, designed to reduce attrition during the high-risk period of transition from post-doctoral fellowship to receipt of the first extramural research award.

Method—Scholars receive 25% salary support for two years to enable their participation in a research survival skills practicum, mentored collection of pilot data, preparation of manuscripts for peer-reviewed publication, and submission of K23 and K01 proposals.

Results—Of 22 junior faculty scholars appointed during the period of 1999–2004, 17 have submitted K award proposals. All were funded on either the first or second submission

Conclusions—A program for junior faculty scholars can provide support for successfully navigating the critical and often difficult transition from post-doctoral fellowship to junior faculty. The program is expanding its efforts to assist K awardees in moving successfully along the developmental continuum (e.g., successful submission of R01, development of mentoring skills).

Recruiting and retaining junior faculty in psychiatric research careers has been the focus of our National Institute of Mental Health-sponsored psychiatric research education grant (R25 MH60473) since 1999. The Junior Faculty Scholars (JFS) program addresses a high-risk period for attrition from the research career pathway, namely, the transition from a research postdoctoral fellowship to a research career development award (or other first extramural grant support) (1). We have been able to utilize JFS-program resources to help young faculty members compete successfully for K awards.

The strategies underlying our research training efforts are based on several premises: First, we believe it is necessary to think *longitudinally* about the developmental needs of trainees, a point strongly emphasized in the recent IOM report (2003) *Research Training in Psychiatry Residency: Strategies for Reform* (2). Therefore, it is important to identify transitions when trainees are at special risk for leaving the academic research enterprise and to develop strategies to bridge them (1). Our current mode reflects an integration of internship and residency training, postdoctoral training, and our JFS program, as well as integration with project EXPORT in the Center for Minority Health at the University's Graduate School for Public Health (Figure 1).

Second, research training must be *collaborative* and interdisciplinary (3,4). We encourage commitment to peer review in the broadest sense; that is, we have graduate trainees (M.D.s and Ph.D.s), postdoctoral fellows, and junior faculty scholars from multiple disciplines meet

together in several different forums to learn collaboratively, to share written products (e.g., manuscripts and grant applications in development), and to critique each other's work as a National Institutes of Health (NIH) review committee might. We believe such collective wisdom inspires and improves the scientific work done by all of us. This approach, however, also serves multiple process functions—it enhances interpersonal relationships and collaboration among trainees. This prosocial attitude also sustains the ethical climate in which research is conducted, promoting naturally a system of checks and balances in which ethical lapses are less likely to occur. In addition, as appropriately recognized in NIH Roadmap, the future clinical researcher (throughout biomedicine) needs to have an interdisciplinary perspective (3–5).

Third, we emphasize the K series mentored career development awards (K01 and K23) as the primary vehicles for a successful *transition* at the postdoctoral and junior-faculty levels into the role of independent investigator, an emphasis consistent with the recommendation of NIH Director's Panel on Clinical Research (6). Our rationale is driven by issues of professional identity and of funding. In terms of professional identity, a K award validates for the candidate, professional colleagues, and the funding agency that the recipient has made a significant commitment to life as a clinical or basic researcher. Writing a K forces a candidate to create a specific research identity and promotes the mentored collection of pilot data. In pragmatic terms, the current funding structure for initial K awards from NIMH (as much as 100% salary support up to a maximum of $90,000 per year and an annual research budget of $50,000 for 5 years) makes them more secure than R-series awards (R01, R03, R21, and R34), where the proportion of salary support is typically lower and where an initial award is often of shorter duration.

Method

The JFS program is designed to address barriers that are modifiable through partial support for base salary and pilot research, focused mentoring, and technical and scientific consultation. These barriers are discussed below.

Inadequate Grant-Preparation Skills

In our discussions with students and faculty, a frequently reported career development need is effective skills in writing of grants and publications. We view grant-preparation skills to include mastery of both the technical components (i.e., design and measurement) of grant preparation and, importantly, the art—from choosing topics of appropriate public health significance and scientific scope to ensuring adequate pilot data, providing reasoned arguments, and engaging departmental and NIH program support.

Poor Time Management

As pointed out by Bruce (7), junior faculty scholars can experience two types of time management problems. The first is poor time management strategies on a day-to-day basis such that they have difficulty devoting sufficient time to research-related activities (from data collection to grant writing) due to competing demands (e.g., responsibilities related to clinical care, teaching, serving on other investigators' grants, family). The second reflects inadequate attention to career timetables, resulting in junior faculty not having taken the appropriate steps (e.g., manuscript production, pilot data acquisition, grant writing) to enable them to meet the requirements needed for each step of the career path (7). We would underscore the importance of mentoring in preventing or reducing these problems. As Bruce (7) has emphasized, mentorship provides junior investigators a relatively objective individual to help them make decisions about how to use their time and to implement strategic career development timetables.

Falling Behind the Scientific Curve

Psychiatric research is challenging both conceptually and methodologically both because of the patient's complex set of mental health, health, and social needs, and because of inadequacies in the systems that care for these needs. One implication for research development is the need for investigators to stay abreast of rapid advancements in several complex fields. Another implication is that much of the research conducted in psychiatry needs input from multiple disciplines, ranging from neuroimaging to sociology. These two needs tax many junior investigators who are trying to pull together the pieces for their K award or first R01. The JFS program makes available senior scientific consultants from a wide array of expertise (from economics to anthropology and from ethics to statistics) to critique applications and provide technical guidance. Our experience has been that many of these consultant relationships transform into collaborative ones.

Map of the JFS Program

In Year One, we support 25% of the scholars' time to allow them to participate in the weekly research survival skills seminar. In addition, they are expected to develop proposals for pilot research grants and to begin to collect pilot data in support of a K award application. In Year Two, assuming satisfactory progress, we again support 25% of their time to allow them to participate in the research survival skills practicum, to complete collection of pilot data, and to write a K award application. Scholars are expected to submit the K award application by the first half of Year Two so that the proposal can receive one review prior to the end of their appointments. In many cases, scholars are able to submit K award applications in the first year. Appendix 1 includes our recent extension (into Year 3 and beyond) of the JFS program to include supervised implementation of the K award research plan, subsequent preparation of an R01 proposal, and acquisition of mentoring skills.

Curriculum Development and Mentoring

The directors of the JFS program meet weekly with the scholars in an hour-long research survival skills practicum, for purposes of discussing mutual concerns and problems in professional development. Increasingly, as K awards and pilot projects have been funded, the practicum also has provided a forum to discuss strategies for the implementation of funded projects and progress toward R01 submission. A culture of supportive peer-peer interaction has developed and is fostering an ethos of multidisciplinary research. Our departmental chairman attends these sessions to extend an invitation to the scholars to meet with him at any time about career development issues and to present his vision of how the JFS program fits in broadly with research training opportunities in the department of psychiatry. Similarly, our departmental executive vice chair also attends sessions, especially to facilitate career development in mental health services research. Each scholar has presented progress reports on the development of his or her research program, in the presence of his or her faculty mentor, and received advice on solving problems and help in identifying additional resources. We also require junior faculty scholars to participate via oral platform on poster presentations in other departmental events, such as our annual research day, in order to further integrate themselves into the life of the department.

Formal didactic components of the JFS curriculum have included workshops implemented by course directors and attended by the scholars. For example, an 8-week workshop on neuroimaging covered an overview of positron emission tomography, functional magnetic resonance imaging (fMRI), application of fMRI to probe memory/cognitive and psychiatric research, data analysis and interpretation, metabolic studies of dementia and mild cognitive impairment, morphometrics and magnetic resonance spectroscopy in psychiatry, and imaging neuroreceptors. Additionally, various faculty of the department of psychiatry have given

presentations at our weekly JFS meetings. These topics included psychophysiology, online resources and databases for medical research, the gap between efficacy and effectiveness in mental health research, cost effectiveness, and qualitative research. Other popular and well-received workshops have been "Statistical Reasoning for Clinical Investigators" and a series on psychiatric genetics.

The broad goal of these workshops has been to help junior faculty scholars become conversant, or "bilingual," in both neuroscience and mental health intervention and services research and to provide additional venues for them to receive project-specific consultation (scientific and technical) from a broad array of experts within the department of psychiatry and school of medicine, thereby fostering a multidisciplinary mindset.

A Model for Teaching Grant Writing and Other Research Survival Skills

Over the past 14 years we have developed a model for teaching grant writing and other research survival skills to postdoctoral fellows and junior faculty scholars and for improving clinical research mentoring (8). Our course on writing grant applications utilizes a peer-review process modeled after a NIMH study section. By teaching grant-writing skills in a supportive peer environment, providing peer review of proposals, and sharpening expectations of mentors, it is possible to reduce the time between the end of the fellowship and the receipt of the first extramural grant.

In addition to issues in grant writing and research communication skills, this core seminar addresses other topics in professional socialization: research ethics, including potential conflicts between research and clinical priorities; procedures for obtaining human subjects assurances; development of collaborative relationships in a multidisciplinary medical setting; strategies for finding jobs; preparing a curriculum vitae; and dissemination of scientific findings to the public and practitioners. It serves a "process" function, by allowing the program directors to hear about and resolve potential problems and to monitor the general training experience in a proactive way. This approach also addresses one potential danger in training programs at the postdoctoral and junior-faculty levels, namely, isolation. An apprenticeship model encourages a rather exclusive focus on specialty concerns that sometimes neglects the broader sharing of experiences and learning. Moreover, there is evidence that a supportive mentor-trainee relationship can be important in helping students cope with the stresses inherent in training (9). Training in the responsible conduct of research is integrated into the research survival skills practicum.

Mentorship

Clearly, the skills required to be successful as a clinician-researcher cannot be easily reduced to a standard curriculum. A mentor is essential to this process. Studies in biomedical and behavioral research and mental health and psychiatry, specifically, have demonstrated that individuals who become successful independent investigators are more likely to have had an extended mentoring experience. This is especially true for women and minorities. A critical component of the JFS program is oversight and availability of the program director and other senior faculty to identify mentorship problems at an early stage and work with trainees and mentors to resolve them.

Mentoring Roles

There is a range of mentor-like roles that, at various points in time, are developmentally critical. The junior faculty observes a mentor as a role model conducting a research project, managing a lab meeting, negotiating with an institutional review board. Importantly, this type of learning also extends to observing how the mentor balances multiple roles at work and between work

and home. Providing advice and guidance on individual goals and strategies and career pathways to achieve these goals is a core mentorship function. Oftentimes this will require getting quite specific help to delineate their personal objectives. Teaching specific research skills and techniques as well as the formal "rules of the game" in writing grants and getting published is also a key component of mentorship. The mentor is a critical facilitator of professional socialization, advancing the mentee's understanding of academic pathways and culture—both locally and nationally. Linking the mentee to a broader national network of investigators is an important task for the mentor. The mentor must also transmit explicitly and implicitly the essential values of science and the ethical conduct of research. Facing the pressures of academic imperatives, the values of young investigators can become distorted. The mentor must help the mentee reflect on his or her motives and values, often through direct discussion of how the mentor has been able to establish an ethical framework. Especially in the face of inevitable disappointment, the mentor will need to provide direct emotional support and nurturance. The mentor will also need to be an advocate for the mentee (e.g., sponsoring his or her academic advancement, helping the mentee to protect his or her time, linking him or her to potential funding sources). It is unlikely that a single individual can fulfill all of these functions. Ultimately, most successful scientists put together a pastiche of mentors and role models that fills their specific needs.

Assignment of Mentors

Mentor assignment is determined partly on the basis of the scholar's stated preference, appropriateness of fit in scientific interests and expertise, mentoring skills, and interpersonal chemistry. Interpersonal chemistry is most often, in our experience, what determines whether things work out. More specifically, many trainees need a very structured approach and high availability; some senior faculty travel a lot, are like moving targets, and may not tolerate the handholding that is sometimes needed. In our JFS program, during the 5-year period covered by this report on 22 scholars, we have had to change mentors on one occasion.

Pilot Research Awards

Junior faculty scholars receive pilot research support from various research centers in the department and from the JFS-funded pilot study program. For example, three scholars received support from the Mental Health Intervention Research Center (P30 MH30915), four scholars received support from the Intervention Research Center for Late-Life Mood Disorders (P30 MH52247), one scholar each received support from the Conte Center for the Neuroscience of Mental Disorders (P30 MH45156) and from the Treatment Effectiveness Studies in Women (WISE) Center (R24 MH53817). The award of pilot research support is competitive and follows peer review by the Seed Money Research Committee of the department of psychiatry.

Statistical Support

JFS resources have allowed us to appoint a master'slevel statistician working under the supervision of faculty statisticians to assist the junior faculty scholars by providing statistical support.

Results

Outcomes to Date

Over the initial 5-year period (1999–2004), out of 22 scholars appointed, 17 of 17 (100%) who have submitted K award proposals have been funded on either the first or second submission, and two of 17 have also received R01 awards. The K award success rate compares with 36% NIMH-wide over the period of 1997–2003, according to CRISP (Computerized Retrieval of Information on Scientific Projects) (10).

Our experience during the first 5 years of the JFS program suggests that a 25% level of salary support (together with NARSAD, R03, and/or partial support from a mentor's grant), combined with the research survival skills practicum and support for pilot work, has sufficed to achieve the primary objective of the program: successful competition for K23 and K01 awards. The 17 funded K awards have encompassed neuroscience, treatment outcomes research, mental health services research, developmental psychopathology, and geriatric psychiatry. Eight of the successful junior faculty scholars are M.D.s, two are M.D.-Ph.D.s, and seven are Ph.D.s. Four of 22 participants are members of underrepresented minority groups. Of the five scholars who were not successful, two were M.D.s who entered the program without having done a 2-year research fellowship after residency.

Evaluation of the JFS Program by Current Participants

The program directors meet regularly with the scholars to assess the usefulness, appropriateness, and quality of the program. Junior faculty scholars (both current and graduate) have highlighted several aspects of the program as particularly helpful: 1) protected research time; 2) access to a statistician; 3) practical advice; 4) peer support; 5) access to mentors; 6) exposure to other scientific disciplines; and 7) consolidation of professional identity. We summarize below the feedback in several areas, as well as the results of an ongoing needs assessment by current and previous scholars.

1. Practical advice—Participants particularly like group feedback on grant applications and manuscripts from inception to final product. They also value tips on dealing with funding agencies, strategies for coping with evolving Institutional Review Board (IRB) and HIPAA regulations, and suggestions on balancing career-building activities (paper writing, grants, clinical work, teaching).

2. Peer support—The availability of an informal network of like-minded peers has emerged as a major and favorite aspect of the program, including opportunities for social support and for less threatening peer consultation on rough drafts, as a venue to address mentoring problems and for exposure to potential downstream collaborators from other disciplines.

3. Access to mentors—Help in structuring mentoring relationships and enhanced access to senior researchers in the department have been underscored by junior faculty scholars as a dividend of being in the program.

4. Exposure to other scientific disciplines—The JFS program involves acculturation to a multidisciplinary environment, facilitating exposure to diverse but relevant fields of inquiry (ranging from health economics and social psychology to neuroimaging), increased awareness of other programs in the department, and the opportunity to create foundations for future collaboration or consultation with senior scientists.

5. Consolidation of professional identity—Perhaps most important to JFS participants, being in the program has helped to engender formal recognition of their career goals, increased credibility within the department, enhanced material support for the pursuit of research and career development agendas, and accelerated transition to the status of independent investigator.

6. Needs assessment—Current and previous junior faculty scholars have told us they want discussions of project implementation and oversight, including topics like hiring of staff. In addition, they have told us that additional coaching focused on short- and long-term time management, writing R01 applications, and learning mentoring skills would be helpful in

transitioning to being an independent investigator. This feedback has led us to expand group mentoring activities.

Other issues highlighted by previous junior faculty scholars (who now hold K awards) include further socialization to leadership roles in the profession (e.g., study section service and service on editorial boards), balancing the competing demands of career development and citizenship in the academic community, improved understanding of the yardsticks for, and process of, promotion (professorial advancement), increased opportunities to teach and learn mentoring skills, and finding networking and collaboration opportunities to enhance both scientific awareness and stability of financial support.

Additional Program Evaluation

The major criteria for the success of our JFS program are:

- An increase in funded career-development awards (K01 and K23 awards) and R01 awards among junior faculty seeking support at early stages of career development

- Subsequent success in obtaining K02 and K24 mid-career awards in patient-oriented research by graduates of the program that reflect the priorities of this program; that is, increased numbers of dedicated mentors, particularly in areas with genuine translational elements that bridge the gaps from basic to clinical neuroscience and applications that develop new links between efficacy and effectiveness and practice research with direct applications to patient care

- Increased numbers of underrepresented minority candidates successfully launching and maintaining careers as independent researchers

- The successful implementation of our curriculum and the added opportunities for training in priority areas that occur as a result

- Greater satisfaction with the research infrastructure and support provided by the department and enhanced productivity among our faculty in priority research areas.

Methods for evaluating the program are summarized in Appendix 2.

Conclusions

The JFS research educational program is designed to meet the needs of junior-level investigators. The program 1) assists with successful competition for K awards; 2) decreases the lag between early career development support and independent R01-level funding; and 3) increases knowledge and skills in mentoring and other responsibilities of academic leadership.

To benefit from the program, scholars should have completed a research fellowship prior to entry. Two scholars who did not submit K awards also had not completed a prior research fellowship. We believe that the lack of a research fellowship was an important and probably fatal handicap. Research career development after psychiatry residency probably should be viewed as a 7- to 10-year process for most trainees.

Our experience also underscores the need to better train mentors to be attuned to the special needs of many M.D.s for structure, time management, and practice in writing and reviewing. Mentors need to be available on a regular basis.

The issue of generalizability is also important. Ours is a large research-intensive department with extensive infrastructure and many mentors. Though most departments cannot mount an effort on the scale described here, our hope is that by describing the ingredients of what we do, smaller departments will be able to import selected ingredients and adapt them to their

specific environments and needs. In addition, some research-intensive departments, including ours, engage in distance mentoring to help young faculty living and working in less rich environments.

Finally, in terms of future efforts, we are focusing on helping K awardees prepare competitive R proposals. This is a vital component of longitudinal research career mentoring. In addition, we are working with senior and mid-career mentors to develop models of mentoring teams in the service of multidisciplinary research training.

Appendix

Appendix 1. Junior Faculty Scholars (JSF) Program: Longitudinal Map of Career Development Activities

Year 1

Develop and implement mentoring plan

Participate in JFS group activities (e.g., research seminars with invited guests, journal clubs, discussion of mutual concerns and problems in professional development) Research survival skills practicum

Research ethics course and related activities in the Center for Medical Ethics

Apply for pilot research grant

Collect pilot data

Didactic workshops

Year 2

Continue implementation of mentoring plan

Participate in JSF group activities (e.g., research seminars with invited guests, journal clubs, discussion of mutual concerns and problems in professional development)

Research survival skills practicum

Continue collection of pilot data

Submit early career development award (K01 or K23). This award will be submitted by the first half of the year, allowing for one review prior to the expiration of the 2-year appointment

Didactic workshops

Year 3 (and beyond)

Following successful competition for K23 or K01 awards, Junior Faculty Scholars will:

Pursue a mentoring plan encompassing the steps needed to implement Level I K activity and develop a successful R01 proposal

Undertake training to develop mentoring skills in preparation for submitting K24 or K02 proposals

Continue participating in didactic workshops and research survival skills practicum

Appendix 2. Program Evaluation: What Data Are Collected, From Whom, and When

Measure	From Whom Collected	Frequency
Usefulness, appropriateness and quality of *overall program*	Current participants	Annual
	Past participants	Annual
Ratings of Individual Components	Current participants	Annual
Protected research time		
Access to a statistician		
Practical advice		

Measure	From Whom Collected	Frequency
Peer support		
Access to mentors		
Access to other scientific disciplines		
Consolidation of professional identity		
Mentoring plan/timetable		
Outcome Measures (competitive funding)	Current participants	Annual
	Past participants	Annual
Receipt of Level-I K		
Receipt of NARSAD Award (Junior, Independent, Senior)		
Receipt of R03 as PI		
Receipt of R01 as PI		
Service as Core Director or as PI on project within P01		
Service as Co-PI/Co-I on NIH Award		
Receipt of K24 Award		
Receipt of K02 Award		
Other Outcomes: Markers of Research Career Development	Past participants	Annual
Appointment to NIH study section		
Appointment to editorial board		
Mentor to Junior Faculty, pre- or post-docs		
Symposium chair or other academic leadership		
Professorial advancement		

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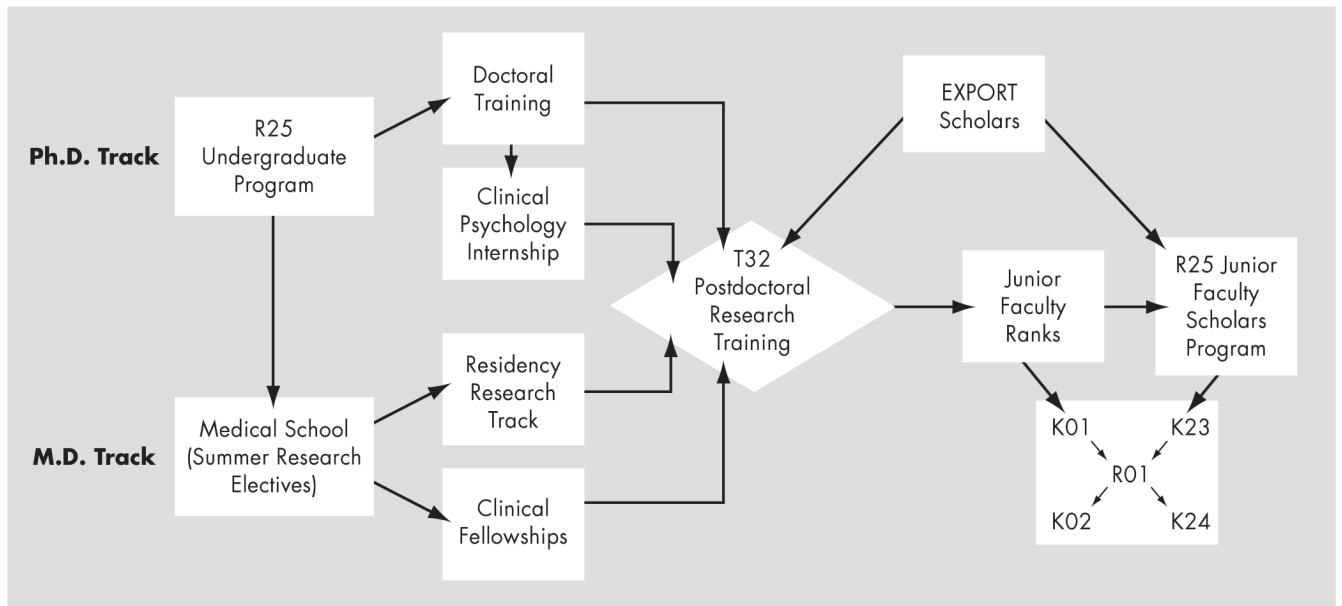10. Personal communication from Jane Steinberg, Ph.D., NIMH, October 1, 2003

FIGURE 1. The Western Psychiatric Institute and Clinic Model
The WPIC model emphasizes 1) early recruitment into research career development; 2)
continuity; 3) acquisition of research survival skills; and 4) multidisciplinary mentoring.
EXPORT scholars are those recruited via collaboration with the Center for Minority Health at
the University of Pittsburgh Graduate School for Public Health.