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# Extending the Pipeline for Minority Physicians: A Comprehensive Program for Minority Faculty Development

ABSTRACT

Medical schools must become more successful in training minority faculty. Minority faculty development programs at schools of medicine must involve trainees from the undergraduate years (if not before) through junior faculty and must involve MD and combine-degree (MD–PhD) students. The authors describe the comprehensive minority faculty development program at the University of Pennsylvania School of Medicine, which involves minority undergraduates, medical students, residents, fellows, and faculty. This program provides the administrative staff and research methodologists to assist trainees at all levels across all departments in the school of medicine. The principal student recruitment program is the undergraduate premedicine enrichment program. The medical student component provides general counseling, research development, and activities to enhance performance in the clinical courses. The components for advanced trainees (residents, fellows, and postdoctoral trainees) and faculty consist of training in research methods, mentoring, teaching skills, and scientific writing skills. Through this program, the University of Pennsylvania School of Medicine has increased the number of underrepresented minority faculty by 32% since 1993–94 and created an environment conducive to the professional growth and development of minority faculty.
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The University of Pennsylvania School of Medicine has a long-standing commitment to minority faculty recruitment and development. By 1993, the school had several outstanding development programs for students and faculty. The school's Office of Minority Affairs, established in 1968, had helped the school attain an enrollment in which more than 14% of the student body and 15% of the first-year class were members of minorities underrepresented in medicine. (The school's Combined Degree Program and Physician Scholar Program had provided a variety of biological sciences research experiences for minorities, and it eventually would have the largest number of African American and Hispanic combined-degree students among U.S. medical schools.) Several of the school's centers, institutes, departments, and programs had demonstrated a substantial commitment to training minorities: among the most active were The Center for Clinical Epidemiology and Biostatistics, the Robert Wood Johnson Clinical Scholars Program, the Departments of Psychiatry and Reproductive Biology, and the Divisions of General Medicine and Geriatric Medicine of the Department of Medicine. By 1993, as a result of these programs, 28 of 858 full-time faculty in the

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*For articles on related topics, see pages 223, 226, 231, 288, 299, and 336.*

two major promotion tracks (the tenure and clinician–educator tracks) (3.26%) were African American or Hispanic.

However, some of the school's faculty and leaders were still concerned about the lack of an adequate infrastructure to systematically recruit and develop minority faculty. Although some departments and divisions had high proportions of minority faculty and advanced trainees (residents, fellows, and postdoctoral trainees), others had few or none. For example, although seven of the school's 18 minority faculty in 1993 were in the tenure track, the basic science faculty contained no African American in the tenure track. Many of the junior minority faculty were unclear about the requirements for promotion or had unrealistic expectations of how they would succeed in the triple roles of clinicians, investigator, and administrator. Others were attempting to develop clinical research without pilot funding and without access to skilled research methodologists or statisticians. Some minority faculty members found their research impeded by multiple commitments to administrative, clinical, and teaching responsibilities.

Equally important, minority physicians often seemed unsuccessful in finding mentors, a step crucial to eventual success as an independent investigator.[1] This impression was confirmed by a study conducted by the Center of Excellence that showed many junior faculty never formed mentoring relationships with senior faculty. Minority residents, fellows, and postdoctoral trainees, although at a stage where introduction to research and teaching skills is fundamental to their future success as academicians, were often unaware of or unable to access the myriad resources of the medical center, and therefore some had inadequate guidance for several years. Some minority candidates who sought research careers at the University of Pennsylvania had insufficient experience in research to make them competitive in the tenure track, where success is based on productivity as an investigator. As a consequence, too few minority faculty were recruited, and their progression through the promotion system was unpredictable. Too many minority faculty were leaving after a few years, to be replaced by others, thereby creating a cycle of substitution of one assistant professor for another.

Because of these limitations and shortcomings, the school sought additional support to increase the number of minorities entering its faculty development pipeline. Underlying these efforts were several convictions. First, a "grow your own" philosophy was necessary because of the limited number of minority faculty nationwide and because a redistribution of faculty from another institution to the University of Pennsylvania would not best serve the nation's interest. Second, minority faculty training must involve many segments of the faculty development pipeline.[2,3] Preparation must begin during the undergraduate years, if not before, and continue into medical school, involving MD as well as combined-degree (MD–PhD) students.[4] Because most of the minority faculty at the University of Pennsylvania (and elsewhere) hold MD rather than PhD or combined degrees, a large pool of potential faculty is overlooked by minority faculty development programs that concentrate on combined-degree students. More minority MD-degree students would find research attractive if they had appropriate exposure and mentorship early in their careers. In addition, minority faculty development is needed at the residency, fellowship, and postdoctoral levels. Third, although the general requirements and needs of minority faculty are similar to those of majority faculty, the barriers to success are different: minority faculty may have less research experience, few minority faculty role models, few minority colleagues, and more involvement early in their careers in administrative and/or clinical activities. (Because medical schools need their few minority faculty to take on extra committee assignments, administrative duties, and mentoring as part of the schools' minority programs, young minority faculty members carry higher and more diverse workloads than do their majority peers.)

One of the authors (JCJ) led the effort to create a comprehensive program. With a grant from the Division of Disadvantaged Assistance, Bureau of Health Professions, he and his staff developed the Center of Excellence on Minority Health to develop minority physician leaders in academia, a mission consistent with that of the medical school. The center's specific aims are to increase the numbers of minority students and faculty, to increase the research skills of minority students and faculty, to facilitate research on minority health issues, and to incorporate more content relevant to minority health issues in the curriculum of the medical school.

In this article, we describe and discuss the University of Pennsylvania Comprehensive Minority Faculty Development program. (See Figure 1 for a schematic depiction of the program.) Unless stated otherwise, the term *minority* refers to African American and Hispanic. The center's activities to introduce more minority-health topics into the curriculum and to facilitate research on minority health issues are not discussed in this article, which focuses on faculty development activities. It is important to note, however, that the university's program is comprehensive and interconnected, with the faculty development component an integrated part of the whole. The faculty development program encompasses four levels of trainees: premedical students, medical students, advanced trainees (residents, fellows, and postdoctoral trainees), and faculty. The principal student-recruitment component is the undergraduate premedicine enrichment program. The medical student component provides general counseling, research development, and activities to enhance performance in the clinical courses. The components for advanced-degree trainees and faculty consist of training in research methods, mentoring, teaching skills, and scientific writing skills.

For each component of the program, we provide the ratio-

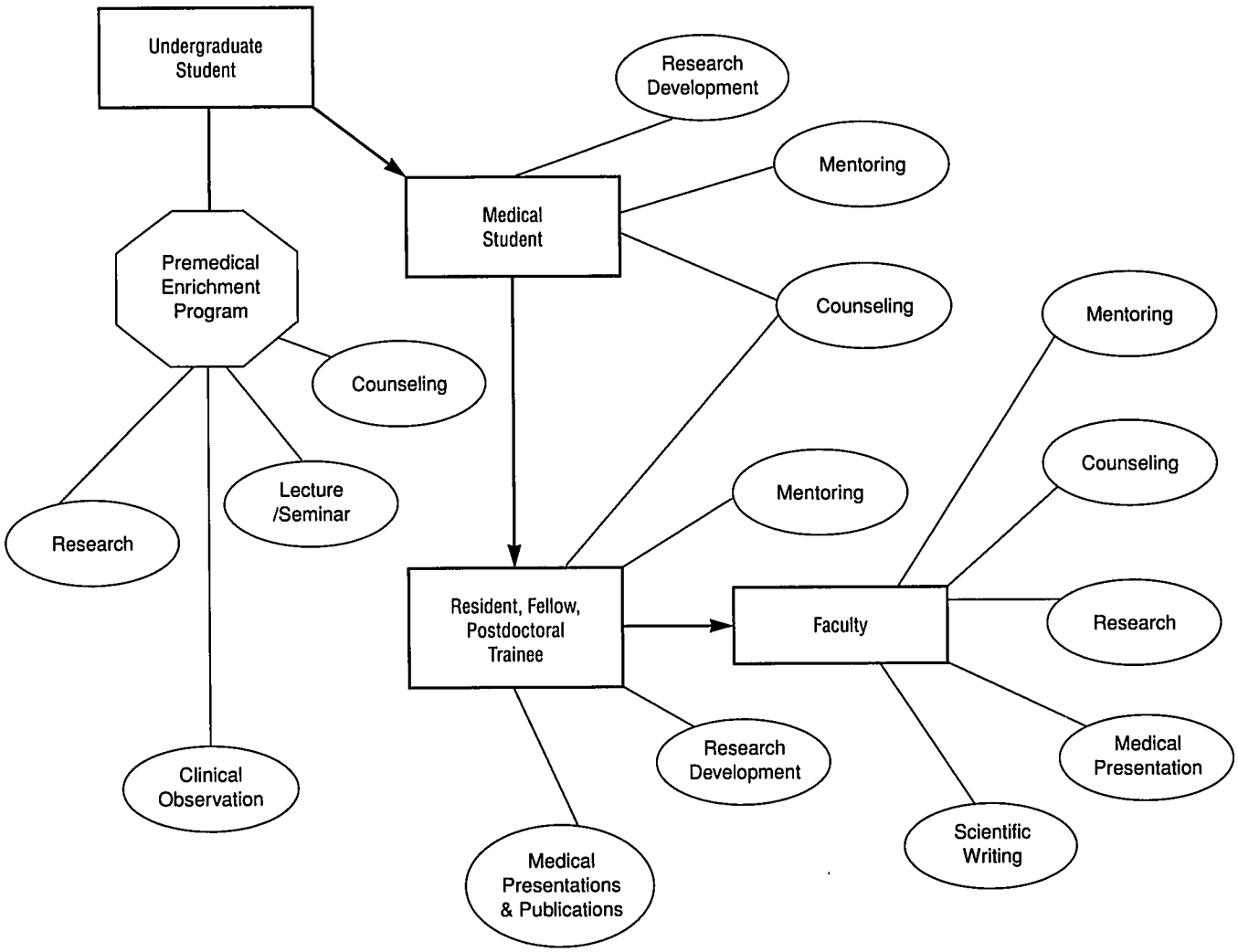


**Figure 1.** Comprehensive program for minority faculty development, University of Pennsylvania School of Medicine.

nale and a brief description, and then briefly summarize its achievement and impediments.

## PROGRAM ACTIVITIES

### Medical Student Recruitment

Although the center directs a portion of its resources to the recruitment and retention of minority medical students, the Office of Minority Affairs of the School of Medicine is primarily responsible for this task. Currently, there are 125 underrepresented minority students (74 African American, 46 Hispanic, and 5 Native Americans), which represents 18% of the student body, compared with 14% in 1993. Between 1993 and 1997, the proportions of underrepresented minority students ranged from 14% to 19%. Nevertheless, the center recognizes the potential difficulty of maintaining the current numbers of minority students because of a limited applicant pool and the potential influence of anti–affirmative-action legislation.

The principal recruitment activity of the Center of Excellence is the *Pre-medicine Enrichment Program for Minority Undergraduates (PEP)*, begun in 1991 to prepare minority undergraduates from a national applicant pool (mainly from the historically black colleges and universities). This program differs from minority development programs that concentrate on strengthening undergraduate science skills in preparation for careers as medical practitioners (the Health Careers Opportunity Program model) and programs that focus solely on research (often restricted to basic science research labs). Unlike many summer minority research programs, the center's program aims to prepare future minority

**Table 1**

**African American (AA) and Hispanic (H) Composition of the Full-time Faculty, University of Pennsylvania School of Medicine, 1992–1997***

| | 1992–93 | | | 1993–94 | | | 1994–95 | | | 1995–96 | | | 1996–97 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Group | | Total | Group | | Total | Group | | Total | Group | | Total | Group | | Total |
| Track | AA | H | Faculty | AA | H | Faculty | AA | H | Faculty | AA | H | Faculty | AA | H | Faculty |
| Clinician–educator | 14 | 7 | 356 | 17 | 11 | 408 | 16 | 10 | 472 | 16 | 10 | 492 | 19 | 12 | 550 |
| Tenure | 3 | 4 | 502 | 3 | 4 | 470 | 4 | 4 | 458 | 3 | 5 | 445 | 2 | 4 | 447 |
| TOTAL | 17 | 11 | 858 | 20 | 15 | 878 | 20 | 14 | 930 | 19 | 15 | 937 | 21 | 16 | 997 |

*During 1992 through 1997, 25 African American and Hispanic faculty members were recruited, while 14 departed (including three who retired).

MD faculty as well as combined-degree faculty. In contrast to many summer research programs that offer experiences in basic science research, the research experience encompasses basic, clinical epidemiology, and health services research. Another feature of the program is the substantial interaction of summer students with minority medical school faculty and minority medical students. All students in this program have minority faculty as clinical or research preceptors.

This program, now in its sixth year, invites a cohort of students to the University of Pennsylvania for a summer experience, followed by continued assistance and counseling through graduation in course selection, research, and negotiating successfully the medical school application process. Over ten weeks, 10–15 students who have completed two years of undergraduate education (most students are prejuniors) engage in research (50% time), clinical observations (10%), introductory lectures on medical school basic science (20%), and seminars (20%) designed to stimulate their interest in academic medicine and assist them in applying to medical school successfully.

Since 1991, 59 minority students (10–15 students per summer) have attended the summer enrichment program each year. Nineteen of them attended two summers (usually consecutively) because we strongly encourage all students to repeat the experience to gain maximum benefit. Of the 59 students who participated, 38 received baccalaureate degrees. Of these 38 students, 25 (66%) applied to medical school (with an average total MCAT score of 24 and an average undergraduate GPA at graduation of 3.5), and 23 (92%) were accepted, well above the national average for African Americans and Hispanics. Of the remaining 13, one student plans to apply to medical school for the class entering in 1999, two entered other health professions programs, five chose non–health-related careers, and five students' plans are unknown. Four students published articles or abstracts with their summer research mentors in journals, and one student was selected as a Fulbright Scholar to continue research with his faculty mentor under our program. Most important, these undergraduates were exposed to medical research early in their academic study, thus introducing them to academic medicine while stimulating interest in biomedical research.

Our principal difficulties in implementing this aspect of our program were limited funding and the limited number of faculty mentors. The structure of our program and our long-term commitment to the students—from their initial summer enrollment to their graduation from college—allow us to accommodate only 10 to 15 students per year. While we would like to offer the program to more students, we are partly constrained by competition with other health sciences programs at the university for summer research preceptors. We seek preceptors who are committed to minority faculty development and are willing to give inexperienced students meaningful supervised research experiences. Because we want every student to form a relationship with a minority faculty member during the summer, we are constrained by the small number of minority faculty available as clinical or research preceptors. Funding restrictions are another difficulty. Our federal grant provided support for some but not all of our student activities, and our attempts to get outside funding showed that granting agencies and private foundations are most interested in funding students engaged full-time in research (or no research if the aim is to prepare practitioners). To pay for needed services not covered by the federal grant, we obtained institutional support to complement the federal funding. Finally, we tried unsuccessfully to facilitate ongoing involvement in research during the academic year at the students' undergraduate institutions by forging relationships with research mentors at those institutions. For this inter-institutional collaboration to work effectively, however, we need additional staff and funds to establish meaningful partnerships.

### Medical Student Academic Enrichment

Because the graduation rate of the school's underrepresented minority students over the past 30 years has exceeded 95%, the center focused on improving the academic achievement and research skills of its minority students. Before the center was created, counseling of medical students was an integral component of the school's retention efforts. The counseling covered personal, financial, residential, socio-cultural and academic areas. To complement these efforts, the center created several reinforcement activities, including informal quarterly meetings of minority students with residents, fellows, and faculty; an annual pre-clinical orientation session for third-year students; an annual oral presentation practice session; and research skills development. The clinical enrichment activities were based on the belief that attaining the highest grades in clinical courses is instrumental in obtaining a position in the most competitive residency programs. The research component consists of four elements: (1) a monthly research discussion series designed to introduce students to successful investigators (minority and majority), who discuss their research interests and personal experiences in research, (2) a summer research seminar designed to introduce students to the fundamentals of clinical and health services research, (3) a placement program designed to identify research projects for students, and (4) methodologic assistance for students in study design, data entry, data analysis, and manuscript preparation.

Both the clinical and the research activities were effective. To assess the impact of the clinical support programs, we compared the minority students' grades in the required clinical courses in medicine, surgery, pediatrics, obstetrics–gynecology, and psychiatry from 1993 to 1996. The percentages of minority students attaining honors grades increased in obstetrics–gynecology, psychiatry, and surgery, but not in pediatrics and medicine. In all cases, the numbers of students are too small to assess statistical significance. We assessed the impact of the research program by noting the participation in research activities: 19 minority students engaged in center-sponsored summer research, 10 took a summer course in the fundamentals of research, and over 50 attended the research discussion series.

Success has not been without difficulties. In 1993, in an attempt to increase the number of minority students attaining honors grades, we attempted to assign minority clinical mentors to each student during required clinical rotations. We immediately encountered difficulties. First, only a small number of minority faculty were available to serve as mentors. Second, logistics were a problem. We considered it crucial that the students meet their mentors during the first two days of the clinical rotation, but the students' and mentors' schedules often conflicted. As a result, this approach to mentoring was abandoned. Finally, each year since the initiation of the center, the school has modified the form and content of one or more of the required clinical courses, making it difficult to design an intervention and measure its impact.

The students' participation in research was impeded by logistic constraints, but these were countered by careful planning. Although we involved the students in planning the summer research lecture series, they did not participate as much as expected. Therefore, we linked summer research funding support from the center with attendance at the lectures and altered the format of the summer series in response to recommendations from the students.

### Resident, Fellow, and Postdoctorate Activities

Realizing that residents, fellows, and postdoctoral trainees are sources of future faculty, the center concentrated some of its efforts on recruiting and training these advanced trainees. In collaboration with division and department chiefs, center staff interview resident and fellow candidates, make referrals to division and department chiefs, and provide per diem and tuition support for research projects conducted with senior faculty. In addition, the center annually hosts a dinner for residents and fellows where trainees discuss career paths and opportunities and receive guidance from senior faculty. Other activities related to research skills described in the subsequent section under faculty development are also offered to these advanced trainees.

We do not have accurate outcome data for this aspect of our program, for several reasons. First, in 1993, there was no reliable source of data across all departments for minority residents, fellows, and postdoctoral trainees. Therefore, in 1995 we created a mechanism to obtain these data, a process that required almost a year. Second, the work schedules of residents and fellows make them less accessible, resulting in long delays in communication. Third, these trainees leave the university at a greater rate than do faculty. As a result, there is a constant need to update the center's records.

### Faculty Recruitment

As at many institutions, faculty recruitment at the University of Pennsylvania School of Medicine is decentralized and is largely conducted by divisions and departments, where recruitment of minorities is aggressive in some but certainly not all departments. To address this problem, the center developed a multifaceted recruitment program for minority faculty. In collaboration with the center, the Department of Medicine (the largest department in the school) created an Office of Minority Recruitment. Among its projects, this office annually sponsors a minority visiting scholar for medical grand rounds and other activities. The center produced a

minority faculty recruitment brochure for the entire medical center. Center staff interview minority faculty candidates upon request. The center offers partial salary support to selected new minority full-time faculty for two to three years. Most important, the center formed an advisory committee of department and division chiefs and the dean of the school to discuss and share recruitment strategies. Perhaps the greatest significance of this advisory group is the message it conveys throughout the medical center that the top leadership is committed to minority recruitment and retention.

As a proportion of the total faculty, the number of underrepresented minority faculty increased from 3.3% to 3.7% from 1993 to 1997. However, the increasing size of the total faculty masks the achievements of the medical school in recruiting minority faculty: whereas the number of majority faculty increased 16%, the number of minority faculty increased by 32% (from 28 to 36 faculty) over the four years.

### Faculty Development

To ensure the retention of minority faculty, the center created several faculty development activities. Because such activities are most beneficial to faculty in the early stages of their careers, the principal targets are new and junior faculty with three years of faculty experience or less. The following are brief descriptions of the program's components.

**General career counseling.** The center hosts two group meetings each year with new and junior faculty, one for the tenure and research tracks and one for the clinician–educator track. At each meeting, the chair of the school's Promotions Committee and senior minority faculty lead discussions of pertinent aspects of career development: the promotion process in the school, mentoring, publishing, teaching, committee memberships, and others. In addition, written materials on the promotion process and related matters are distributed.

**Mentors.** One element of our program educates minority faculty about the meaning and significance of mentoring and assists young faculty in identifying and establishing a mentoring relationship. Therefore, the center includes a discussion of mentoring as part of its annual group meetings with minority faculty and distributes written materials about mentoring (what, why, and how). Most important, the center has recruited a cadre of faculty who will either serve as mentors or take responsibility for helping minority faculty establish mentor relationships with other senior faculty members. This cadre of mentors provides general counsel, helps young faculty prepare grant requests and publications and obtain equipment, and helps them obtain external funding.

**Research skills.** To help minority faculty develop strong research skills, the center makes available to minority faculty an epidemiologist, an evaluation specialist, research assistants, statisticians, and data programmers (all funded staff members of the center). They provide research support in study design, data entry and management, data analysis, and manuscript preparation.

**Scientific writing skills.** Published scholarship is essential for promotion. To help minority faculty develop strong writing skills, the center sponsors an annual medical scientific writing seminar, conducted by an international expert on scientific writing.

**Medical presentations skills.** To help minority faculty develop skills in delivering lectures, the center sponsors a highly interactive, multimedia experience designed to teach them to assess, develop, and refine presentation skills. This workshop is organized and facilitated by a trained moderator, who guides participants through an intensive experience of making presentations to medical audiences.

Because the most important outcome of faculty development—promotion to associate professor—requires several years, it is too early to comment on the success of the center's activities. As an alternative, we have identified important intermediate outcomes that we monitor, such as the number of publications, grants, received, and presentations. Collection of outcome data for clinician–educator faculty is particularly difficult because some of the important data, such as quality of teaching, are confidential.

Our problems in implementing the center's faculty recruitment and retention program were attributable to the many, complex needs of minority faculty. Initially, the center provided the same advice and counsel to faculty irrespective of their faculty tracks, but we soon found it necessary to match the activities to the track because the skills and criteria for success in the two tracks differ. Another problem was the paucity of basic science minority faculty role models. The faculty's administrative duties and, even more, clinical care services in the clinician–educator tracks limit the time available to learn teaching and research skills and to publish (all standing faculty must publish). Funding agencies are reluctant to fund researchers who do not already have records of successful research. Therefore, the center has used some of its funds to support selected pilot projects of minority faculty but within the constraints of the granting agency.

Difficulties in implementing the faculty mentoring program are part of a bigger problem. First, although mentoring is often cited as critical to faculty development, the interpersonal nature of mentoring and the commitment required of the mentor and trainee make mentoring difficult to systemize. Certainly, mentoring is not systematic throughout the departments and divisions of the medical school for either majority or minority faculty. Second, effective models of mentoring clinician–educators have not been established. Although most minority faculty at our school and nationwide are in clinician–education or similar tracks, the proto-

typical mentoring models are based on the experience of mentoring basic scientists.

## DISCUSSION

Medical training programs must be more effective in providing underrepresented minority undergraduate and medical students the foundation to successfully pursue careers as medical school faculty.[5–7] Minority faculty add to the depth and breadth of the research and teaching enterprise; and they are role models for minority and majority students. The ineffectiveness of past programs nationally is reflected in the low proportion of minorities (approximately 3.6%)[8] among the nation's medical school faculties.[9,10] Several models of minority faculty development exist, based largely on the basic science model of linking a trainee with a successful investigator. In this model, the trainee receives a stipend or tuition support for the time spent in research (largely mandated to be full time). While intuitively attractive (after all, who can better mentor a young trainee than a successful experienced investigator, and obviously the most effective way to learn research is to concentrate upon it fully), this traditional model gives insufficient attention to the largest potential pool of minority faculty, the MD candidates; it overlooks the many varied supports needed by young minority students and faculty at all stages of the pipeline; and it ignores the reality of the demands on minority faculty. Finally, it overlooks the necessity of creating and maintaining a nurturing environment and a successful mentoring relationship; and it overlooks the need for a centralized administrative structure to address all of these issues.

At the University of Pennsylvania School of Medicine, we have developed a comprehensive model for minority medical school faculty development, emphasizing the development of research skills among MD graduates. This model was developed out of a need to complement existing faculty development efforts that were decentralized and based in the departments and divisions. The new approach provides an infrastructure of research methodologies and administrative staff who develop and implement the programs across departments and divisions for trainees who range from undergraduates to faculty. The program costs approximately $300,000 per year, including $50,000 from the school of medicine. In addition, the medical school contributes a substantial amount of in-kind support such as preceptors and lecturers.

Four lessons learned since we began are important for others who would undertake such an effort. First, because much of the work involves collaboration, it was advantageous that the new center's director was a senior minority faculty member known to many of the division and department chiefs. Second, the director underestimated the substantial commitment of his time that would be necessary to implement and maintain the center's programs. Third, the center's work is labor-intensive, requiring many personal contacts to establish collaborations among distinct and sometimes competitive units in the medical school and to arrange activities among persons with complex and conflicting schedules. Fourth, establishing and maintaining a data management and tracking system to monitor program outcomes and trainees' progress can be difficult because of lack of reliable, valid sources of data. Recruitment data are relatively simple to obtain, whereas performance outcome data are varied and dispersed throughout departments. Many of the important data will have to come from the trainees themselves. Of all the barriers to success, the two major stumbling blocks were the shortage of funds (or restrictions on the manner that funds could be used) and a tradition of decentralized decision making in the medical school that sometimes interfered with collaborative work.

The center's success must be viewed in the context of the medical school's overall development efforts for minority faculty. Our success would not be possible without the commitment of the top administrative leadership of the medical center and without the interest of diverse institutes and centers of the university in minority health and career development. The long-standing, close working relationship between the medical student organizations representing African American and Hispanic medical students facilitates the center's work and prevents friction over access and use of center services between the minority groups we serve.

In sprite of the difficulties of establishing and implementing such programs, discernible changes can be achieved over a relatively short period of three to five years, as demonstrated by our experiences at the University of Pennsylvania. Centers such as ours complement others at the medical school and provide persistent and consistent advocacy for minority recruitment and retention across all departments. One of the center's most important roles is to ensure that minority faculty are fully informed of the requirements for success. We encourage other medical centers to establish comprehensive integrated minority medical school faculty development programs for minority faculty members, and we hope that federal and private agencies will recognize the necessity for funding such efforts.

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## Correction

A typesetting error was made in the January 1998 article "Patient, Physician & Society: Northwestern University Medical School."[1] On page 17 of that article, Chart 1 was incorrect in the "Wednesday" column. An accurate version of the chart is printed below.

**Chart 1**

**Schedule for the "Colleges" in the Patient, Physician & Society Course***

| College Mentor | Monday | Tuesday | Wednesday | Thursday |
|---|---|---|---|---|
| **Hirschtick** | Patient–Physician | | Physician–Society | |
| **Nuzzarello** | Physician–Society | | Patient–Physician | |
| **McKenna** | | Patient–Physician | | Physician–Society |
| **Franklin** | | Physician–Society | | Patient–Physician |

*This example shows the schedule for the four colleges in the Class of 2000.

1. Makoul G, Curry RH. Patient, physician, & society: Northwestern University Medical School. Acad Med. 1998;73:14–24.