

Cooperative Approaches to Stimulating Minority Participation in Graduate Pharmaceutical Education

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SUMMARY. There exists a paucity of minority students in higher education in general and in graduate pharmaceutical education in particular. A formal articulation has been created between the Colleges of Pharmacy of The Ohio State University and Xavier University of Louisiana, majority and minority institutions, respectively. This agreement has as its primary objective to stimulate undergraduate minority student interest and promote their participation in graduate and postbaccalaureate professional pharmaceutical education. It also provides for the exchange of visiting professors between the institutions. The provisions of this agreement and the progress to date are described.

Blacks, Hispanics, and American Indians are underrepresented in post-graduate higher education, a pattern observed in professional education and graduate programs in science, engineering, and pharmacy. This paucity of graduate students is directly responsible for the insufficient numbers of minority pharmacy faculty members and scientists. To contribute to the alleviation of this problem, a linkage was established between Xavier—an institution providing a source of qualified undergraduate mi-

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Permission to use the Affiliation Agreement between Ohio State University and Xavier University of Louisiana (appendix) is granted from Xavier University of Louisiana College of Pharmacy.

nority students and Ohio State—an institution seeking to play a proactive role in providing graduate pharmaceutical education to underrepresented minorities. To further this objective, a formal articulation agreement has been developed between these institutions, the provisions of which are described here and which may serve as a model for other similar joint ventures between majority and minority institutions. This paper describes such a cooperative and symbiotic relationship and concludes with an appraisal of our progress to date.

The paper begins by presenting a global overview of the participation of minorities in higher education to offer a context for better understanding the demographics of minorities in pharmacy education.

DEMOGRAPHICS OF MINORITIES IN HIGHER EDUCATION

A superficial perusal of the demographic statistics of minority participation in higher education suggests that considerable advances were made between the late 1970s and 1980s. Increases of 30.9 and 63.4 percent in the numbers of bachelor's and first-professional degrees awarded, respectively, were noted from 1976 to 1987. At the doctorate level, minorities earned 7.6 percent more Ph.D.s in 1988 than in 1978 (Table 1) (1).

More critical analysis of these numbers reveals significant imbalances among racial/ethnic groups and between genders. These differences become evident when we examine the parity relationship between the proportion of a racial/ethnic group participating in a degree category and the fraction of the national population represented by that group. When so expressed, whites are proportionately represented, with those receiving bachelor's, master's, doctorate, and first-professional degrees constituting 94-106 percent of their numbers in the population. With the exception of Asian-Americans who earn degrees at a proportion which constitutes up to 127 percent of their representation in the population, other minority groups are underrepresented across degree categories: blacks, 28.5-46.3 percent; Hispanics, 29.6-35.8 percent; and American-Indians, 57.1 percent (Table 1).

Of all racial/ethnic groups, blacks—in particular, black males—experienced the greatest decreases in all degree categories from the period of 1976-78 to 1987-88. The overall 4.3 percent reduction in blacks earning bachelor's degrees, and in particular, the 12.2 percent decrease among black males, portends a significant attenuation in the pipeline of individuals subsequently eligible to enter graduate programs. Blacks also experi-

TABLE 1. Population and Earned Degrees by Race/Ethnicity and Sex¹

	United States Population ²		Bachelor's		Master's		Doctorates ³		First Professional	
	1988 Total	vs 1980 ⁴ Total	1987 Total	vs 1976 Total	1987 Total	vs 1976 Total	1987 Total	vs 1978 Total	1987 Total	vs 1976 Total
Total	100.0	8.2	100.0	7.9	100.0	-6.4	100.0	-8.4	100.0	15.4
men			48.5	-3.8	48.8	-14.6	59.0	-23.8	65.0	-11.2
women			51.5	21.9	51.2	-3.0	41.0	29.2	35.0	158.2
Minority	15.8	19.9	12.1	30.9	10.6	0.5	9.1	7.6	11.2	63.4
men			11.3	23.6	10.1	4.7	8.0	-11.5	10.2	23.2
women			12.9	37.6	11.0	-2.9	10.7	40.4	13.2	206.7
Asian	2.6	70.3	3.3	191.4	3.0	118.8	2.6	56.9	3.2	135.9
men			3.6	173.0	3.7	117.4	3.0	43.9	3.1	88.6
women			3.0	215.3	2.2	121.1	2.1	93.2	3.4	306.2
Black	12.3	12.7	5.7	-4.3	4.8	-31.8	3.5	-22.1	4.8	26.9
men			4.7	-12.2	3.6	-34.0	2.3	46.7	3.9	-8.9
women			6.7	1.7	5.9	-30.5	5.2	10.0	6.3	133.8
Hispanic ⁵	8.1	34.1	2.7	50.3	2.4	32.9	2.6	25.6	2.9	90.1
men			2.7	26.5	2.4	16.1	2.3	1.3	2.8	42.4
women			2.8	81.3	2.5	52.8	2.9	75.0	3.0	356.1
Amer-Indian	0.7	18.9	0.4	13.6	0.4	41.4	0.4	55.0	0.4	60.8
men			0.4	-5.0	0.4	21.3	0.4	2.0	0.4	12.9
women			0.4	36.1	0.4	65.9	0.4	320.0	0.5	365.4
White	84.2	6.2	84.9	3.7	79.1	-12.9	89.3	-5.2	87.5	11.3
men			84.6	-8.5	74.7	24.3	90.0	-21.0	88.4	-13.9
women			85.2	18.6	83.3	0	88.3	34.5	85.8	153.0

1 Earned degree data from reference (1)
 2 U.S. Department of Commerce, Bureau of Census, series P.25, No.1045.
 3 U.S. citizens only.
 4 Expressed as a percent change for the years noted.
 5 Persons of Hispanic origin may be of any race; the majority are included as white.

enced a 22.1 percent decrease in the numbers of doctorates earned from 1978 to 1988, with black males declining by 46.7 percent.

Proportionately fewer blacks enrolled as undergraduates are earning bachelor's degrees than are whites. A comparison of students enrolled in 1986 with degrees earned in 1987 reveals that while blacks represented 9.2 percent of the undergraduate population in 1986, only 5.7 percent graduated the following year. By contrast, 79.2 percent of all 1986 undergraduates were white and yet whites constituted 87.5 percent of all bachelor's graduates in 1987 (1).

Hispanics (1), in contrast to blacks, made significant gains in the number of degrees earned between 1976 and 1987: bachelor's, 50.3 percent increase; master's, 32.9 percent; doctorate, 25.6 percent; and first-professional degree, 90.1 percent. By a significant margin, greater gains were made by Hispanic women than men (Table 1).

By far, Asian-Americans are proportionately best represented in higher education and have exhibited the greatest gains among minority racial/ethnic categories in degrees earned from 1976 to 1987: bachelor's, 215.3 percent increase; master's, 121.1 percent; doctorate, 93.2 percent; and first-professional degree, 306.2 percent. Although as in other categories females showed greater growth than males, the disparity was somewhat less disproportionate with Asian Americans.

At all levels of higher education, American Indians only earn about 0.4 percent of degrees granted. Gains in the percentage of degrees earned from 1976 to 1987 were seen across all degree levels, with women primarily responsible for the gains in almost all instances.

Major differences are observed among racial/ethnic groups in their selection of fields for advanced training. This impact is particularly felt in the sciences and engineering (2). Significant numbers of underrepresented minority students (i.e., blacks, Hispanics, American Indians) drop out of science early in high school. This results in a poor foundation in mathematics and science and contributes to the fewer number of such students entering science-oriented majors in college. Other contributing factors include a lack of orientation to pursue higher education and the severe shortage of role models and mentors.

Underrepresented minorities currently constitute 22 percent of our population but only 4.4 percent of scientists and engineers. Among 1,268 Ph.D. degrees awarded to U.S. citizens in 1989, only 65 (5 percent) were earned by Hispanics and blacks. The number of Ph.D. degrees granted to blacks has not increased since 1975; the highest percentage increases have occurred among Asian-Americans and Hispanics (2).

A composite summary of the racial/ethnic demographics of instruction-

al faculty in all institutions of higher education is presented in Table 2 (3). These data may be compared with the proportion of the various racial/ethnic groups within the total population. Minority members of the population are generally underrepresented as instructional faculty. Of all instructional faculty, 10.1 percent are members of a racial/ethnic minority, only 63.9 percent of their representation in the population. Black faculty members are represented at one-third parity, whereas Hispanics and American-Indian faculty members represent 21.0 percent and 57.1 percent, respectively, of their ethnic group's contribution to the population. Asian-American faculty are represented at 154 percent of their numbers in the general population, whereas whites are closest to parity at 107 percent.

Comparisons may also be made between numbers of those from minority groups enrolled as students and serving as faculty. The overall percentage of minority faculty members (10.1 percent) is comparable to the proportion of minority students (9.1-11.2 percent) enrolled in master's, doctorate, and first-professional degree programs but lower than the percentage (12.1 percent) enrolled for the bachelor's degree. Blacks and Asian Americans each constitute about four percent of the total instructional faculty. It is beyond the scope of this paper to attempt to further analyze the racial/ethnic distribution among academic disciplines or across levels of higher education.

This situation has prompted many national professional and education-

TABLE 2. Comparative Racial/Ethnic Demographics of Instructional Faculty

	All Institutions ¹		Colleges of Pharmacy ²	
	N	%	N	%
Total	464,072	100.0	2939	100.0
Minority	47,036	10.1 [63.9] ³	385	13.1 [82.9]
Asian	18,370	4.0 [154]	186	6.3 [242]
Black	19,227	4.1 [33.3]	122	4.2 [34.1]
Hispanic ⁴	7,704	1.7 [33.3]	64	2.2 [27.2]
Amer-Indian	1,735	0.4 [57.1]	13	0.4 [57.1]
White	417,036	89.9 [107]	2554	86.9 [103]

¹Full-time instructional faculty in all institutions of higher education in 1985 (Reference 3).

²Paid full-time and part-time faculty in 74 colleges of pharmacy in 1990-91 for which race/ethnicity has been reported (Reference 7).

³Expression of parity (where 100 = parity): percent of racial-ethnicity category as instructional faculty/percent of category in total population (Table 1).

⁴Persons of Hispanic origin may be of any race.

al organizations and universities to develop programs to increase minority participation in graduate programs. Some of these programs, including the new National Science Foundation initiative, are comprehensive from K-12 to college and through graduate studies. This program, with recruitment activities focused on minority students, has established a turn of the century goal of increasing to 2,000 the number of Ph.D.s granted to minority U.S. citizens (2). Other programs include locator services, summer research opportunities, faculty and student exchanges between minority and majority institutions, and graduate recruitment conferences and fairs. Involvement of minority students in the recruitment process is thought to be useful (4).

DEMOGRAPHICS OF MINORITIES IN PHARMACY EDUCATION

Undergraduate studies in pharmacy provide an excellent preparation for many pharmacy graduate programs and, in some cases (for example, the postbaccalaureate doctor of pharmacy degree), the only acceptable prerequisite background. From 1972 to 1989, the overall percentage of entry-level professional pharmacy degrees (B.S. and Pharm.D.) awarded to minority students increased from 8.7 to 15.1 percent (Table 3) (5).

More critical analysis of the data reveals that these gains were primarily attributed to a 2.3-fold increase in the numbers of Asian-Americans and a 1.9-fold increase in blacks—in particular, black females—earning degrees during these years. This gender differential was most apparent after 1980. Between 1981 and 1989, there were 77.6 and 22.9 percent more B.S. and entry-level Pharm.D. black female graduates, respectively, than males (5). The average numbers of entry-level Hispanic students graduating from the period 1972-75 to 1986-89 increased by 29.4 percent. Although American Indians are only modestly represented in pharmacy programs, student enrollment has risen significantly from 45 to 81 from 1987 to 1989 (6). Despite these gains, we should not lose sight of the fact that considerable disparity continues to exist between their participation in these programs and their representation in the population.

Academic posts and leadership positions in industry and government generally require that candidates have an earned terminal degree (i.e., Ph.D., Pharm.D.) and, to an increasing extent, postdoctoral training. Disappointingly few blacks, Hispanics, and American-Indians earn Ph.D. degrees in the pharmaceutical sciences, with their sum total rarely in

TABLE 3. Entry-Level Pharmacy Degrees (B.S., Pharm. D.) Conferred by Minority Racial/Ethnic Group, 1972-1989¹

	Asian American	Black	Hispanic	American Indian	Total Minority/period	Total Degrees/period ²
1972-1975						
Total/period	613 ⁴	600	751	15	1979	22,711
Average/year	204.3	150.0	187.8	5.0	547.1	5677.8
Range/year	188-219	138-176	134-272	0-8		4858-6712
% Total ³	2.7	2.6	3.3	0.07	8.7	
1976-1980						
Total/period	1264	1162	1414	49	3889	38,248
Average/year	252.8	232.4	282.8	9.8	777.8	7649.6
Range/year	222-292	226-272	241-315	6-15		7432-8011
% Total	3.3	3.0	3.7	0.13	10.2	
1981-1985						
Total/period	1580	1213	1225	42	4060	32,254
Average/year	316.0	242.6	245.0	8.4	812.0	6450.8
Range/year	288-339	230-250	217-261	5-13		5735-7323
% Total	4.9	3.8	3.8	0.13	12.6	
1986-1989						
Total/period	1480	1196	972	43	3691	24,395
Average/year	370.0	299	243.0	10.8	922.8	6098.8
Range/year	335-454	282-310	217-258	8-12		5800-6557
% Total	6.1	4.9	4.0	0.18	15.1	

¹ Reference (5).

² Degrees conferred to all graduates.

³ Percentage of total degrees conferred to minorities/period.

⁴ 1973-1975 only.

excess of four percent of doctoral degrees earned by all American students (Table 4). Since 1972 on only two occasions have as many as four black students and on only four instances have at least four Hispanic students earned this terminal science degree in a given year; since 1987 Hispanics have been exhibiting a generally improving trend (5). By contrast, Asian-Americans consistently receive more than half the total of all Ph.D. degrees earned by minority students in pharmacy.

An entry-level professional pharmacy degree is often used as undergraduate preparation for doctoral studies in the pharmaceutical sciences. When the numbers of Ph.D. degrees earned from 1986-1989 are expressed as percentages of entry-level professional degrees earned by specific racial/ethnic groups, we see a rank order of Asian-Americans and whites (each 2.4 percent), Hispanics (1.2 percent), and blacks (0.84 percent) (5). With regard to the percentage of postbaccalaureate Pharm.D. degrees awarded to American students, among minority categories during the 1980s blacks fared best, followed by Asian-Americans and Hispanics (Table 5).

Members of minority groups appear to be proportionately better represented on college of pharmacy faculties than institutions of higher education taken as a whole, i.e., 82.9 versus 63.9 percent of group population parity (7). This difference may be principally accounted for by the greater representation of Asian-American (24.2 percent of group population parity) and a small contribution by Hispanic (27.2 percent) faculty members in pharmacy schools (Table 2). While it may be argued that the 1990-91 data for pharmacy faculty cannot be compared directly with 1985 data for all faculty, it is unclear that substantive quantitative demographic changes have occurred in the intervening years that would significantly alter the conclusions presented.

OBJECTIVES OF THE OHIO STATE-XAVIER COOPERATIVE VENTURE

The objectives of the Ohio State-Xavier venture were driven by an overall philosophical societal commitment by The Ohio State University. As a public land grant institution, Ohio State is deeply committed to a societal responsibility to provide access to students of all racial and ethnic origins. The University has an aggressive affirmative action program that seeks to enroll (and, more importantly, graduate) underrepresented minority students at all levels including postbaccalaureate graduate and professional studies in the health sciences.

**TABLE 4. Ph.D. Degrees in the Pharmaceutical Sciences Conferred by Minority Racial/
Ethnic Group, 1972-1989¹**

	Asian American	Black	Hispanic	American Indian	Total Minority	Total American	Total Degrees ²
1972-1975							
Total/period	15	11	6	0	32	511	728
Average/year	3.8	2.8	1.5	0	8.0	127.8	182.0
Range/year	3-7	2-4	1-4	0		120-137	168-189
% Total ³	2.9	2.2	1.2	0	6.3	100	
1976-1980							
Total/period	43	7	4	1	55	620	875
Average/year	8.6	1.4	0.8	0.2	11.0	124.0	175.0
Range/year	5-12	1-3	1	0-1		107-144	153-189
% Total	4.9	0.8	0.5	0.11	6.3	100	
1981-1985							
Total/period	73	6	12	1	62	739	1029
Average/year	8.6	1.2	2.4	0.2	12.4	147.8	205.8
Range/year	3-13	1-2	1-7	0-1		132-163	180-232
% Total	5.8	0.8	1.6	0.14	8.4	100	
1986-1989							
Total/period	35	10	12	0	57	694	1093
Average/year	8.8	2.5	3.0	0	14.3	173.5	273.3
Range/year	6-13	2-4	1-4	0		158-189	260-287
% Total	5.0	1.4	1.7	0	8.2	100	

¹ Reference (5).

² Degrees conferred to all graduates.

³ Percentage of degrees conferred to all American graduates.

Between the years 1983-1987, Ohio State ranked third nationally in the total numbers of doctor of philosophy degrees earned by blacks and Asian-Americans (8). From 1982-1990, the University conferred a total of 1,146 master's and 308 doctorate degrees to racial/ethnic minorities: black, 687 and 164, respectively; Asian-American/Pacific Islander, 260 and 97; Hispanic, 169 and 41; and American Indian/Alaskan Native, 30 and 6 (9).

Three target objectives were established for the Ohio State-Xavier venture, each of which is independent and not reliant on the success or degree of progress made in meeting the other objectives; these were targets having an impact on students, faculty, and the institution. The participants in this project did not seek nor anticipate achieving a "quick-fix" to alleviating the underrepresented participation of, in this case, blacks in postbaccalaureate pharmaceutical education. Rather the administrations of both institutions sought to develop mutual confidence between the faculties and long-term programmatic support and agreed to share expenses associated with the program.

Student Recruitment

The primary objective is to stimulate and promote minority student interest in postbaccalaureate graduate (M.S., Ph.D.) and professional (Pharm.D.) pharmaceutical education. Although not expressly stated in the articulation agreement, selected minority students who had gained their doctoral degrees at Ohio State, and completed postdoctoral training at another institution, might be recruited to join our faculty.

Faculty Interactions

To develop and encourage collaborative research and scholarly projects of mutual interest between interested faculty at both institutions. This objective was best promoted by providing administrative support for the exchange of visiting professors.

Institutional Objectives

Among the publicly articulated long-range goals of the College of Pharmacy at Ohio State is to increase the numbers of underrepresented minority individuals (in particular, blacks, Hispanics) with doctoral degrees in the health professions and in the pharmaceutical sciences who can contribute to and assume leadership positions in academia, industry,

and government. Xavier is committed to assisting Ohio State in its recruiting efforts to achieve this objective.

**ARTICULATION AGREEMENT
BETWEEN THE COLLEGES OF PHARMACY,
OF THE OHIO STATE UNIVERSITY
AND XAVIER UNIVERSITY OF LOUISIANA**

Mechanical Aspects of Establishing Agreement

Informal discussions by deans at the two institutions revealed a fundamental and mutual desire and commitment to work cooperatively to increase the numbers of underrepresented minority students in postbaccalaureate pharmaceutical education. Although it was acknowledged that a formal agreement between the institutions was highly desirable, there was clear recognition that the success of this relationship was dependent upon the continued goodwill and commitment of the college administration and faculty.

Multiple early drafts of the agreement were exchanged between the parties at the college level to ensure that the basic elements of the informal discussions were captured in the document. Nonbinding and helpful input was solicited from the Provost's office at Ohio State prior to the formal drafting of an articulation agreement. Primary concern focused upon the associated potential binding commitments and obligations. These fears were assuaged by the inclusion of the agreement's preambular statement that "The individual sections of this articulation agreement are based on the availability of suitable faculty members or students and the mutual agreement of both parties to accept such exchange individuals." The document became finalized in Spring 1989 after signatures were secured from the college deans and the vice presidents for academic affairs at both institutions.

Overview of the Terms of the Agreement

The agreement (reproduced in its entirety in the appendix) contains four primary sections: visiting faculty; graduate student recruitment; undergraduate research participation; and the establishment of coordination committees.

Visiting Faculty. The agreement describes the duration of faculty visits; fiscal obligations for both institutions, the faculty participants, and

sponsors; faculty responsibilities associated with the visit; and the nature of the faculty selection process. Visiting Xavier professors at Ohio State are expected to participate in a research/scholarly project on a full-time basis during 2-4 month appointment periods and provide a final report summarizing the results obtained. Ideally, such relationships would be maintained after the conclusion of the period of the visiting professorship. This individual may also assist the host institution in their undergraduate and graduate minority student initiatives. Such activities might include making recruitment presentations to and meeting with current and prospective students. Financial expenses associated with the leave are to be shared by both institutions.

Visiting Ohio State professors at Xavier are expected to provide scientific or professional seminars to the student body and faculty; consult or collaborate on academic or research projects; and stimulate interest in graduate studies in the pharmaceutical sciences and the postbaccalaureate doctor of pharmacy program.

Graduate Student Recruitment. Ohio State faculty will be invited to Xavier to provide general information about its postbaccalaureate professional and graduate studies, including a description of the programs and degree requirements, academic preparation, admission criteria, financial aids, and career opportunities. While obviously highly desirous of attracting Xavier students to Ohio State, we envisioned this objective in a broader context to be the general promotion of postbaccalaureate education. Several primary approaches were adopted to achieve the student recruitment objective as described below.

Ohio State Recruitment Visits. One or more Ohio State faculty members visit the Xavier campus for several days each year. Activities associated with this visit include the presentation of a scientific or professional seminar on a topic of interest to the undergraduate pharmacy students; meetings with interested students; and group and individual descriptions of opportunities for postbaccalaureate studies at Ohio State. This visit is scheduled to permit the faculty member to represent the graduate programs at Ohio State at the annual Xavier Graduate and Professional School Day Program.

Xavier Student Visits to Ohio State. During the academic year, Xavier students interested in exploring postbaccalaureate educational opportunities at Ohio State are encouraged to visit our College and meet with faculty members and graduate students in their area(s) of interest. They also meet with representatives of the Graduate School and Office of Minority Affairs and tour Columbus.

Undergraduate Research Participation (URP) Program. Since 1986,

Ohio State's College of Pharmacy has been recognized as a University Center of Excellence and has received funding from the State of Ohio to promote research and to interest and encourage students to pursue graduate studies in the pharmaceutical sciences. Under the terms of the articulation agreement intended to promote minority student interest in post-baccalaureate pharmacy education, Xavier publicizes Ohio State's annual summer URP program and encourages interested students to make application. Every effort is made to permit student participation on a research/scholarly problem of first choice from among a list of approximately 50 problems. Upon the recommendation of the Xavier pharmacy dean, each year Ohio State will allocate up to two of its 15 positions to Xavier minority pharmacy students. Stipends and housing allowances are provided.

Coordination Committees. The agreement calls for the establishment of a joint articulation committee to review the activities described in the articulation agreement and propose changes for future agreements. In addition, the Xavier dean serves as a consultant to Ohio State's College of Pharmacy on affirmative action activities and as an ex officio member of the Ohio State Dean's Advisory Committee on Affirmative Action. Dean Marcellus Grace, Xavier, regularly receives and comments upon the minutes of these Committee meetings and has generously provided our College advice and support in our efforts to recruit minority students.

APPRAISAL OF PROGRAM PROGRESS

The most important accomplishment of the joint venture to date has been a solidification of goodwill between the faculty and administration of the Colleges of Pharmacy at Ohio State and Xavier. We recognize that both parties are committed to the long-term success of the joint venture and that tangible "bottom line" success will be slow in coming.

Faculty Interactions

During 1990, a Xavier visiting professor spent the summer at Ohio State working on a research problem in medicinal chemistry and utilizing specialized instrumentation available at our college. Both the visiting professor and his host were extremely pleased with their joint venture, the results of which were presented at an international meeting. On the basis of the experience gained on this project, and to support the continuation of this promising research, Xavier purchased a similar nuclear mag-

netic resonance spectrometer. A member of Xavier's clinical faculty has visited Ohio State, presented a seminar to faculty and students and met with the members of the Student National Pharmaceutical Association, the minority professional organization.

Student Recruitment

Since the program's inception, a total of eight Xavier undergraduates, a member of their staff, and faculty escorts have visited Ohio State in two field trips. The prospective graduate students participated in group orientation programs and for the majority of their time, were hosted by and dined with Ohio State faculty members and students representing academic programs of their greatest interest. Of these, one application was completed and a graduate fellowship was offered. A second individual, while not completing an application, explored two of Ohio State's graduate programs in considerable detail. After much deliberation, these outstanding candidates decided to pursue their graduate studies at other colleges of pharmacy. Some of the undergraduate student visitors were in their early years of professional study, and it is premature to expect their application to our postbaccalaureate programs.

During two successive years, members of the Ohio State faculty have visited the College of Pharmacy at Xavier, presented scholarly seminars, meeting with their faculty and undergraduate students, and attempting to promote linkages between the institutions. The names of pharmacy and nonpharmacy students interested in Ohio State graduate and professional programs were forwarded to the appropriate program personnel.

Undergraduate Research Participation Program

Although a number of students have expressed interest in participating in our summer research program—perhaps as the result of their heightened awareness stimulated by the Ohio State-Xavier interaction—none have participated in our program. Several have pursued similar opportunities at other colleges of pharmacy and in the pharmaceutical industry.

Institutional Objectives

The articulation agreement signed between Ohio State and Xavier has generated considerable interest as a model at Ohio State and in pharmacy education circles (10). The University's higher administration has pointed to it as an exemplar for establishing formal college or departmental

agreements between majority and minority institutions. From the outset, both the parties concurred that our relationship would not preclude the entrance into similar agreements with other institutions. Employing the terms of the Xavier agreement, Ohio State is hosting a visiting professor from another minority institution during summer 1991. For its part, Xavier has established similar or identical articulation agreements with the pharmacy schools at the University of Iowa and the University of North Carolina and is in advanced stages of discussion with several other institutions.

Institutions contemplating entering into such relationships should recognize and appreciate that even under the best circumstances and goodwill tangible evidence of progress will be slow in coming and difficult to document. We are hopeful that this long-term investment will result in a significant increase in the numbers of minority graduate students who will provide leadership into the twenty-first century.

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NOTE

1. Persons of Hispanic origin may be of any race. For census purposes, the majority are "white."

REFERENCES

1. American Council on Education. Minorities in higher education: eighth annual status report, 1989. Washington, DC: American Council on Education, 1989.
2. Rawls RL. Minorities in science. *C&EN* 1991;69(15):20-35.
3. United States Equal Employment Opportunity Commission. Higher education staff information report file, 1985 (unpublished data).
4. Olson C. Recruiting and retaining minority graduate students: a systems perspective. *J Negro Educ* 1988;57:31-42.

5. Penna RP, Sherman MS. Degrees conferred by schools and colleges of pharmacy, 1988-1989. *Am J Pharm Educ* 1990;54:304-19.
6. Penna RP, Sherman MS. Enrollments in schools and colleges of pharmacy, 1988-1989. *Am J Pharm Educ* 1990;54:451-77.
7. American Association of Colleges of Pharmacy. Profile of pharmacy faculty, 1990-1991. Alexandria, VA: American Association of Colleges of Pharmacy.
8. Office of Scientific and Engineering Personnel. National Research Council. Summary report 1987: doctorate recipients from United States universities. Washington, DC: National Academy Press, 1989.
9. Edgar A. Ohio State University Graduate School, 1991 (unpublished data).
10. Gerald MC, Cassady JM, Grace M. Ohio State-Xavier agreement for graduate and faculty collaborative ventures. American Association of Colleges of Pharmacy abstracts of podium and poster sessions, 1989

APPENDIX

Articulation Agreement Between the Colleges of Pharmacy of The Ohio State University and Xavier University of Louisiana

The individual sections of this articulation agreement are based on the availability of suitable faculty members or students and the mutual agreement of both parties to accept such individuals.

I. VISITING FACULTY

A. Duration

This agreement establishes the reciprocal exchange of visiting professors between The Ohio State University and Xavier University of Louisiana no fewer than once during successive 12 month periods.

1. The Ohio State University College of Pharmacy will sponsor the visit of one Xavier University of Louisiana visiting professor annually. It is generally envisioned that such visits will be during the summer and one quarter/semester/term (3-4 months) in duration; based upon mutual consent this period may be shorter or longer and during a time other than the summer. Activities associated with this visit may be pursued prior to or after the actual period of residence in Columbus.

2. A faculty member from The Ohio State University College of Pharmacy will visit the Xavier University of Louisiana campus (e.g., to teach a minicourse, consult or collaborate on academic or research projects, discuss opportunities for graduate and post-baccalaureate study at The Ohio State University College of Pharmacy) for a mutually acceptable period of time. Xavier University of Louisiana will assist in arranging housing.

B. Fiscal Considerations

1. The professor will be granted a professional leave from Xavier University of Louisiana College of Pharmacy which will be responsible for providing salary, fringe benefits, and traveling expenses.

2. The Ohio State University College of Pharmacy will assist in arranging housing and will be responsible for providing a reasonable allowance to defray housing expenses while in Columbus (\$1000/month). The Ohio State University College of Pharmacy will provide the equipment and laboratory or office space required to carry out the project. The director of the sponsoring project at The Ohio State University will provide all research supplies.

C. Responsibilities

1. The visiting professor will participate on a research/scholarly project on essentially a full-time basis. The specific nature of the project will be based upon the mutual agreement of the visiting professor and the sponsoring division or professor of The Ohio State University. A final report summarizing the results of the project will be submitted to the deans of the Colleges of Pharmacy of The Ohio State University and Xavier University of Louisiana.

2. The visiting professor will assist The Ohio State University in its undergraduate or graduate minority recruitment efforts by providing consultation with its faculty and administration, and making presentations to and meeting with current and prospective undergraduate and graduate students.

D. Selection Process

1. With the support of the Xavier University of Louisiana Dean, the visiting professor, specializing in the pharmaceutical sciences or pharma-

cy practice, will formally apply to The Ohio State University College of Pharmacy and the sponsoring division.

2. The Ohio State University College of Pharmacy and sponsoring division and faculty member(s), after reviewing the letter of application, resume of the candidate, and the proposed nature of the research/scholarly activity, may agree to serve as sponsors of the visiting professor and the proposed project. In addition, they may agree to provide reasonable space, facilities, equipment, and supplies that are required to successfully pursue the project.

II. GRADUATE STUDENT RECRUITMENT

A. The Ohio State University Recruitment Visits

1. Once annually, for a recommended 3-5 working days, The Ohio State University faculty member will be invited to present a scientific or professional lecture (on a topic acceptable to Xavier University of Louisiana) and have the opportunity to discuss opportunities for graduate or post-baccalaureate studies at The Ohio State University to interested Xavier University of Louisiana students. All expenses associated with this visit will be paid by The Ohio State University.

2. The Ohio State University Graduate Programs Recruiter will attempt to attend each year at least one Graduate and Professional School Day Program conducted at Xavier University of Louisiana; such a visit may be coupled with that described in II.A.I.

B. Graduate Student Applicants

1. Xavier University of Louisiana agrees to disseminate information regarding The Ohio State University's graduate and post-baccalaureate studies to interested students.

2. The Ohio State University agrees to give careful consideration for admission and stipend and fellowship allowance to all qualified students recommended by the Xavier University of Louisiana Dean or faculty.

3. Where deemed appropriate, applicants will be invited to visit The Ohio State University, with the expenses paid in part by The Ohio State University.

**III. ACADEMIC CHALLENGE
UNDERGRADUATE RESEARCH PARTICIPATION
PROGRAM (ACURPP)**

1. Xavier University of Louisiana agrees to disseminate information regarding The Ohio State University's ACURPP to interested students.

2. The ACURPP will take under careful consideration for approval those candidates strongly recommended by the Xavier University of Louisiana Dean and will attempt to allocate no fewer than one position annually to such students. In addition to providing such students the usual stipend allowance, an attempt will be made to defray their round-trip travel expenses, locate local housing, and acquaint the student with The Ohio State University Office of Minority Affairs.

IV. COORDINATION COMMITTEES

A joint articulation coordinating committee will be created, having at least two members from each college, and made responsible for all operational aspects of the program. The College of Pharmacy Deans will serve as ex officio members of this committee. This committee will also review the activities described by this agreement and recommend changes for future articulation agreements.

The Xavier University of Louisiana Dean will serve as a consultant to the College of Pharmacy of The Ohio State University on affirmative action activities and as an ex officio member of the Dean's Advisory Committee on Affirmative Action.