

INSTRUCTIONAL DESIGN AND ASSESSMENT

Theoretical and Conceptual Framework for a High School Pathways to Pharmacy Program

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Objectives. To determine whether participation in the University of Illinois at Chicago College of Pharmacy (UIC-COP) Pathways to Pharmacy, an early urban pipeline program, motivated underrepresented minority students to pursue a prepharmacy curriculum in college and choose pharmacy as a career.

Methods. Over a 4-year period, underrepresented minority high school students participated in a comprehensive 6-week program that included 3 weeks of prepharmacy curriculum and intensive socialization and 3 weeks working as a pharmacy technician in a chain pharmacy. The High School Survey of Student Engagement (HSSSE) was administered 3 times to 120 program participants from 2005-2008, with 4 open-ended questions added to the pretest, 3 open-ended questions added to the test administered at the midpoint of the program, and 7 open-ended questions added to the posttest.

Results. After completing the program, 88 (75%) of the 120 students enrolled in the college's prepharmacy curriculum and planned to pursue a career in pharmacy, 10 (8%) were not interested in pursuing a career in pharmacy, and 20 (17%) were undecided, compared to the pretest data which showed that 40 (33%) were interested in a career in pharmacy, and 80 (67%) were undecided ($p < 0.0001$).

Conclusions. Participation in a Pathways to Pharmacy program grounded in both a theoretical and conceptual socialization model framework increased the number of underrepresented minority students in the pipeline to pharmacy schools.

Keywords: Pathways to Pharmacy program, socialization, High School Survey of Student Engagement, student recruitment, diversity, minority recruitment

INTRODUCTION

One of the greatest educational challenges facing health professions colleges is how to attract more underrepresented minority students to their programs¹ – a need that is underscored by the changing US demographic landscape. The percentage of underrepresented minorities in the United States is 29.4%,² and by 2050, minorities will replace white Americans as the majority population.³ This demographic shift reflects an expected increase in the proportion of nonwhite Americans whose primary language is not English and who have diverse cultural values and beliefs regarding health and healthcare delivery. This implication has significant workforce development consequences for pharmacy and other healthcare professions. The Department of Health and Human Services (DHHS) in 2000 found that while there was a shortage of pharmacists generally, the shortage was

more severe for underrepresented minority pharmacists. DHHS concluded that without fundamental changes in pharmacy practice and education, the shortage of underrepresented minority pharmacists will persist.⁴ For the purposes of this study, underrepresented minority students were operationalized as African Americans/blacks, Hispanics/Latino, and Native Americans.

Of the 10,988 first professional doctor of pharmacy (PharmD) degrees conferred in 2008-2009 in the United States, 60.6% were awarded to whites; 6.3% to blacks/African Americans; 4.1% to Hispanic/Latinos; 21.2% to Asian Americans; 0.6% to Native Americans/Alaska native; and 4.7% and 2.7% to foreign and nonpermanent residents.⁵ Of the 108,396 applications received by US colleges and schools of pharmacy, 14.4% were from underrepresented minorities (blacks/African American, 10.1%; Hispanic/Latinos, 4.0%; Native Americans/Alaska native, 0.3%). Underrepresented minorities accounted for 11.2% of student enrollment in pharmacy colleges and schools (blacks/African Americans, 6.5%; Hispanic/Latinos 4.2%; Native Americans/Alaska Native, 0.5%).

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The purpose of this study was (1) to determine whether participation in a high school Pathways to Pharmacy program motivated students to pursue prepharmacy curriculum in college and choose pharmacy as a career, (2) to develop a Pathways to Pharmacy program model, and (3) to report the profiles of participants in the 2005-2008 UIC-COP Pathways to Pharmacy high school partnership program. Our overarching goal was to increase the applicant pool of underrepresented minority students in the pharmacy pipeline. One way of accomplishing this may be to encourage interest in pharmacy early in students' education, for example, during high school.

Theoretical/Conceptual Frameworks

Guiding this study was the socialization theoretical framework. Socialization was defined by Merton, Reader, & Kendall as "the processes through which a person developed a sense of professional self, with characteristic values, attitudes, knowledge, and skills...which governed his/her behavior in a wide variety of professional and extraprofessional situations."⁶ The use of the socialization theoretical framework construct in developing the UIC-COP -PWP program structure especially provided a vehicle for understanding the influence of the contextual forces that impacted on the health career decision-making processes of URM students. We reviewed the expectations and developmental theories of socialization⁷⁻²⁰ and Astin's need-based sociopsychological model of career choice found in higher education literature. The literature review served to deepen our understanding of the complexities involved in the career decision processes of underrepresented minority high school students and provided a framework for our study (eg, work motivation and expectations) and cultural-environmental factors (eg, socialization and structure of opportunity) could be translated into expectations about work, career choice, and work behavior.²¹

The comprehensive Theoretical and Conceptual Framework Model for Success in Pathways to Pharmacy High School Program (Appendix 1) was developed. Embedded in the model was the Pathways to College Network concept of high expectations, which incorporates inclusive leadership, collaborative partnerships, flexible resources, and professional development.²² The uniqueness of this model is its grounding in epistemological framework with adaptability and applicability for use in other high school pathways to careers programs. To our knowledge, there is no other Pathways to Pharmacy program grounded in the socialization theoretical framework.

The concept of the Pathways to Pharmacy program is not a new idea. Some colleges and institutions offer high

school summer programs such as pharmacy camps and career explorations with the aim of exposing students to the health professions and building a health professions pipeline starting at the high school level.^{23,24} While some of these programs only target underrepresented minority students, others are open to students from all backgrounds. The programs usually range from 4 days to 8 weeks. Often missing from these programs is a community partnership and a theoretical and conceptual model. Furthermore, there is little published longitudinal tracking data on program participants or research to determine whether the programs were effective. Therefore, one of the central aims of this investigation was to contribute to the research literature in understanding how Pathways to Pharmacy and similar high school education-to-career programs should be structured in order to achieve their intended outcomes.

METHODS

Program participants were selected from several Chicago public high schools. The 2008 total enrollment for Chicago public schools was 409,055 students, of which 8.8% were white, 46.2% black/African Americans, 41.2% Hispanic/Latino; 3.5% Asian/Pacific Islander; and 2% Native Americans. Approximately 83.4% were students from low-income households, 14% had limited English proficiency rate, 11.3% truancy rate, 9.7% dropout rate, and 18.8% mobility rate. The overall graduation rate in 2008 was 69%, while the graduation rate for male students was 63.4% and for female students, 75.6%. The breakdown of high school graduates from the Chicago public school system by race was 77% for whites, 68% for blacks/African Americans, 69% for Hispanics/Latinos, 88.3% for Asian/Pacific Islander, and 68.1 for Native Americans. The self-reported mean composite ACT score for Pathways to Pharmacy program students was 21.4, compared to the mean score of Chicago public school students of 17.6 and a statewide mean score of 20.6.²⁵ Additional demographics for Pathways to Pharmacy students are presented in Table 1.

In 2005, UIC-COP collaborated with CVS/pharmacy, the Chicago public school system's Office of College and Career Preparation, and the Coalition for United Community Labor Force (CUCLF), a community grassroots agency, to offer a Pathways to Pharmacy program for high school students. In the spring of 2005-2008, school officials sent letters about the program to all high school principals and science teachers and solicited the principals' assistance in identifying students from their respective schools that met the criteria for participation (3.0 or higher grade point average [GPA], high aptitude in math and science, 98% school attendance record, and junior

Table 1. Profile of 2005-2008 Pathways to Pharmacy Program Participants, N=120

Variable	No. (%)
Age, years	
16	36 (30.0)
17	82 (68.3)
18	2 (1.7)
Race	
Hispanic/Latino/Spanish Origin	12 (10.0)
Native American	1 (0.8)
Asian American or Pacific Islander	6 (5.0)
Black/African American	91 (75.8)
White	9 (7.5)
Other	1 (0.8)
Gender	
Male	26 (21.7)
Female	94 (78.3)
High School Course Grades	
Mostly As	30 (25.0)
Mostly As and Bs	64 (53.3)
Mostly Bs	14 (11.7)
Mostly Bs and Cs	11 (9.2)
Mostly Cs	1 (0.8)
First Language	
English, Yes	106 (88.3)
English, No	14 (11.7)
Instructional Class Type	
General/Regular	8 (6.7)
Honors/College Prep	102 (85.0)
Courses for College Credit	10 (8.3)
Postsecondary Aspirations	
2-year college degree (Associate's)	1 (0.8)
4-year college degree (Bachelor's)	6 (5.0)
Master's degree	12 (10.0)
PhD/advanced professional degree	99 (82.5)
Don't know	2 (1.7)
Assigned Readings	
0-1 hours per week	18 (15.0)
2-11 hours per week	102 (85.0)
Personal Reading	
0-1 hours per week	18 (15.0)
2-11 hours per week	102 (85.0)
Writing, each paper 5+ pages	
0-5 papers	92 (80)
6+ papers	24 (20)

standing). Approximately 300-400 eligible students and their parents were invited to an informational session about the program and students interested in participating were asked to submit an application packet and statement of interest. Students were asked to include in the application packet 2 letters of recommendation from science and/or math teachers and 1 from a community advocate. Completed applications were reviewed by a committee

representing the sponsoring partners and ranked using a scoring rubric developed by UIC-COP. Based on the results, approximately 100 students were invited to the college for a behavioral-based interview similar to pharmacy student interviews.

Interviewers were UIC-COP students and administrators, CVS pharmacists, and public school and CUCLF staff members. After the interviews, those students who were highly recommended by the interviewers were selected for the program. The number of students invited to participate in the program varied from year to year, based on budgetary constraints. Five additional students above the determined number of participants were asked to complete a required online CVS/pharmacy employment questionnaire. The rationale for inviting the additional students was because some students declined our offer, chose not to complete the questionnaire, or provided responses that made them ineligible for employment by CVS. Students who satisfactorily completed the questionnaire were notified and congratulated on having been chosen to participate in the Pathways to Pharmacy program. On the day of program orientation, participants were required to submit the results of their urine drug test (which they had to pass to participate in the program) and show proof of a negative current tuberculosis test.

The program was structured as two 3-week experiences. The first 3 weeks were spent at the college of pharmacy and the last 3 weeks at a CVS/pharmacy. The experience at the college was designed as challenging, high standards-based academic pharmacy socialization. On Monday through Thursday mornings, students were with their assigned faculty preceptors/mentors engaged in learning and observing firsthand the day-to-day work of pharmacists employed in an academic institution. The curriculum integrated academic and social activities, including opportunities for students' professional and personal development, faculty-student interaction and mentoring; exposure to basic science faculty members and researchers; activities to foster team building and student collaboration and interactions; communication/public speaking activities; and required daily reflective writing exercises. Also, groups of students were assigned problem-based case studies to foster critical-thinking and problem-based learning skills. The case studies focused on prevalent disease states found in minority communities such as hypertension, diabetes, and asthma. At the end of the first 3-week session, student groups presented their case study capstone projects to faculty members and peers and faculty members awarded prizes to the 3 groups with the best case presentations.

In the afternoons, faculty members who were not part of the Pathways to Pharmacy program presented the

Introduction to Pharmacy Practice lecture series on various topics in their respective areas of expertise. After the lecture series, a staff member tutored students in pharmacy technician calculations and customer service in preparation for their second 3-week session at a CVS/pharmacy store. Program participants also had the opportunity to interact with PharmD and prepharmacy students who talked with them about why they chose to pursue a career in pharmacy, their experiences at UIC, and high school and college courses the Pathways students should take to prepare for the PharmD program. Presentations also were made by representatives from the UIC Honors College, Financial Aid Office, Office of Admissions and Records, and other campus resources and support programs, and workshop sessions were held on successful transition from high school to college.

The UIC-COP PWP program also was driven by an apprenticeship paradigm with multi-level socialization processes. Thus, for the second portion of the program, students were assigned to a CVS/pharmacy store for 4 days a week (Monday-Thursday) to work as interns/technicians. While laws in other states vary, Illinois law allows high school students who are 16 years old to work as pharmacy technicians/interns as long as they have a valid pharmacy technician license. All of the students applied for and obtained their pharmacy technician license before they started their internship at a CVS/pharmacy store. Fridays were reserved for mentoring and personal development activities in which each student was paired with a retired pharmacist from CVS/pharmacy or UIC-COP faculty member who served as the student's mentor. This was done to further reinforce pharmacy socialization. Fridays also were reserved for activities that enhanced/developed students' public speaking/communication skills, self-esteem, and personal and life skills. A notable guest speaker was Stedman Graham, a businessman, educator, and author, who conducted self-esteem workshops. There also were motivational speakers from the National Basketball Association who spoke about issues of concern to urban minority youths (eg, personal empowerment, victory over violence).

Instrumentation and Data Sources

From 2005-2008, the HSSSE instrument²⁶ was administered to the 120 program participants during orientation. HSSSE relies on students' self-reports to assess the quality of their high school experience.²⁷ The survey results were used to identify which student behaviors were highly correlated with desirable learning and personal development outcomes in high school that might translate to college and professional programs. Students were asked to reflect on the efforts they put into and got from their high

school experiences, the frequency with which they engaged in school activities, the number of hours spent participating in extracurricular activities, and their general perceptions of their school's environment. In addition, students were asked to respond in writing to 4 open-ended questions to determine the following: their general interest in the health professions and the specific health care profession they were interested in pursuing; how the Pathways to Pharmacy program could help students in fostering future career aspirations; and students' expectations of/for the program. These questions served as the pretest.

At the midpoint of the program, students were asked to respond in writing to 3 additional open-ended question to determine the following: students' psychosocial perceptions of themselves and how they thought their peers/others saw them, eg, what would their best friend(s) say about them; whether or not they compared themselves to others and in what way; and what 3 words came to mind when they thought about themselves and why (Table 2).

At the end of the program, an exit survey (posttest) was given to the students. Students were asked to respond in writing to 7 open-ended questions: what were the most meaningful and least meaningful experiences of the program and why; how would they describe the program to a friend who might be interested in participating and would they recommend the program to others; based on their experiences in the program, were students more likely to pursue prepharmacy curriculum in college or a career in pharmacy, and if yes, at what point in the program did they begin to seriously consider pharmacy as

Table 2. Pathways to Pharmacy Students' Responses to Self-Perception Questions, N = 106^a

Opinions	Frequency, %
If I were talking to your best friend, what do you think he/she would say about you?	
Self-motivated	36 (30)
Smart and opinionated	25 (21)
Competitive and hardworking	18 (15)
Goal-oriented	18 (15)
Reliable	12 (10)
Trustworthy	9 (7)
Humorous	2 (2)
Generally speaking, do you compare yourself to others? In what way? ^a	
Grade point average	50 (47)
Standardized test scores	20 (19)
Successful people	18 (17)
Values	10 (9)
Lifestyle	8 (8)

^a Only 106 responses are given because 14 students responded that they did not compare themselves to others.

Table 3. 2005-2008 Pathway to Pharmacy Students' Responses, %

	Very Often/Often ^a	Never ^a
Student's Self-Efficacy		
Asked questions in class	80.7	0
Contributed to class discussion	85.7	0
Prepared ≥2 drafts of a paper/assignment before turning in	66.1	2.5
Attended class with reading/assignments completed	98.3	0.8
Critical Thinking		
Put together ideas or concepts from different subjects	84.6	0.8
Learned something from discussing questions	77.1	4.2
Enjoyed completing a task with a lot of thinking & mental effort	78.8	0.8
Student and Teacher Interaction		
You received prompt feedback teachers on assignments	77.7	0.8
You have discussed grades/ assignments with a teacher	85.1	0.8
You have discussed ideas from class with a teacher outside of class	47.1	10.7
Peer Group Interaction		
You have made a class presentation	76	0.8
You have worked with others on projects/assignments during class	90.1	0
You have discussed ideas from class with others outside of class	79.7	3.4
	Very Much/ Quite a Bit ^b	Very Little ^b
Student's Self-Efficacy		
Learning on your own in HS contributed to your growth	92.6	0
Understanding yourself in HS contributed to your growth	76	8.3
Critical Thinking		
Experiencing deep & critical thinking in HS contributed to your growth	97.5	0
Experiencing solving real world problems in HS contributed to your growth	82.9	1.7
Peer Group Interaction		
Experienced working well with others at your HS contributed to your growth	86.3	0.8
Setting Long-Term Goals		
Experiencing learning work-related skills at your HS contributed to your growth	76.2	3.4
Experiencing developing clear career goals at your HS contributed to your growth	81.2	4.3
Experiencing preparing for college at your HS contributed to your growth	94	0
Communication Skills		
Experience in writing effectively at your HS contributed to your growth	96.6	0
Experience in speaking effectively at your HS contributed to your growth	84.7	4.2
	Strongly Agree ^c	Strongly Disagree ^c
Students' Self-Efficacy		
I have the skills and abilities to complete my work	99.1	0
I get to make choices about what I will study at school	77.8	6
I worked harder than I expected to in HS	65.3	15.7
I determine how schoolwork is evaluated	60.6	9.4
I put forth a great deal of effort when doing my school work	94.2	1.6
Values & Attitudes		
I take pride in my school work	96.3	0
I value the rewards that I get at school for my work	97.3	0.8
I think rules at my school are fair	55.9	13.5

(Continued)

Table 3. (Continued)

	Strongly Agree ^c	Strongly Disagree ^c
I care about my school	88.2	3.3
I place a high value on learning	99.1	0
I have a voice in classroom decisions	83.9	2.5
I think it is important to make good grades	98.3	0.8
I think the things I learn at school are useful	86.4	0
If I could select a high school, I would go to the same school again	62.7	20.4

Abbreviations: HS = high school

^a 4-point scale: from 0 = never to 3 = very often

^b 4-point scale: from 0 = very little to 3 = very much

^c 5-point scale: from 0 = strongly disagree to 4 = strongly agree

^d 2-point scale: 0 = yes; 1 = no

a possible career choice; if not still interested in pharmacy, what careers were they interested in pursuing; were they more likely to apply to UIC for their undergraduate education or elsewhere and which colleges/universities they planned to attend and what were their intended majors; and did the UIC portion of the program exceed/meet students' expectations, why or why not? Students also were asked to respond to a question that asked if they were not considering pharmacy as a career at the start of the program, but now were considering pharmacy as a career; what had influenced/motivated their decisions.

After the program ended, follow-up data were collected continuously from students either through informal interviews or by asking semi-structured questions of students when they attended the UIC-COP Pathways to Pharmacy Prepharmacy Club meetings, which took place 4 times a year. Types of data gathered were students' self-reported GPA, whether they were still taking/pursuing a prepharmacy curriculum or science major; and whether they had received any merit, scholarship, and/or leadership awards. The approval to conduct this study was obtained from the UIC Institutional Review Board.

Data Analysis

To analyze students' responses to the research questions and hypothesized career outcomes, a mixed-methods approach was used because this approach combines the characteristics of good qualitative research (eg, rich descriptions of people's experiences), a flexible and responsive design, and good quantitative research (eg, using theory when possible to define variables).²⁸ We used the panel study technique because this was a longitudinal study in which data were collected from the same participants at different points in time. This design allowed us to study the increasingly complex relationships between socialization experiences during the UIC-COP portion

of the program, the students' personal and professional considerations, and the decision to pursue pharmacy as a career. Although longitudinal studies are said to have less power to detect causal relationships than do experiments, longitudinal studies have more power than point-in-time studies to investigate complex interactions between variables.²⁹⁻³²

For the analysis of the qualitative data gathered from the open-ended questions, we used a content analysis research technique often used in qualitative research and on descriptive statistics. Manning and Cullum-Swan defined this research technique as "a quantitatively oriented technique by which standardized measurements are applied to metrically defined units and these are used to characterize and compare documents."³³ In the content analysis approach, we simultaneously coded our data and constructed categories so as to illuminate the salient characteristics of the document's content.³⁴ In addition, 14 scales/indicators developed from the HSSSE were used to determine how program participants measured on the various constructs selected (Table 3). A chi square test of independence on the students' pretest and posttest of interest to pursue or not to pursue pharmacy was conducted at the alpha level of 0.05.

RESULTS

Twenty-five students participated in the program in 2005; 28 in 2006; 32 in 2007; and 35 in 2008; for a 4-year total of 120 students. Of the 120 participants in the Pathways to Pharmacy program from 2005-2009, 88 (75%) responded on the posttest that they would pursue a prepharmacy curriculum in college and pursue pharmacy as a career compared to 40 (33%) students on the pretest; 10 (8%) responded on the posttest that they were not interested in pursuing pharmacy compared to 0 students on the pretest; and 20 (17%) responded on the posttest that they

were undecided about a pharmacy major/career, compared to 80 (67%) on the pretest ($p < 0.0001$) (Table 4).

All 120 participants in the Pathways to Pharmacy program enrolled in college after graduating from high school, and 88 (75%) enrolled in the prepharmacy curriculum: 16 (64%) students from the 2005 program; 20 (71%) from the 2006 program; 23 (72%) from the 2007 program; and 27 (77%) from the 2008 program. The 25 prepharmacy students from the 2005 program were college seniors by 2008, and all planned to apply to pharmacy colleges/schools.

Based on our semester tracking report and the students' self-reported grades, the overall retention rate from 2005-2008 for Pathways to Pharmacy participants was approximately 96%, including those students not pursuing pharmacy/healthcare professions. In college, the overall average GPA of Pathways to Pharmacy students was 3.2. As of 2008, 1 of the students had received a full tuition scholarship from an elite institution, and 8 were on the dean's list at their college. However, of the 120 program participants, 5 were on academic probation and 2 had been dismissed for academic reasons. The aspects of the program that the students found to be more meaningful or less meaningful are shown in Table 5.

DISCUSSION

The 4-year data and analysis of 120 Pathways to Pharmacy participants revealed that at the end of the programs, 88 (75%) of the students were influenced/motivated to pursue pharmacy as a career as a result of the program versus 40 (33%) who had expressed interest in pursuing pharmacy prior to the program. Based on our continued tracking of the students, 9 of the 16 students in the 2005 cohort had applied to pharmacy schools, while the remaining program participants were taking more than 4 years to graduate from college. This is certainly not uncommon among undergraduate students. As much as we would have liked for the 9 Pathways to Pharmacy program students from the 2005 class who matriculated into

a college of pharmacy in fall 2010 to attend UIC-COP, that was not the case. Most will be attending a pharmacy college/school out of state. The goal of the Pathways to Pharmacy program was to increase the number of underrepresented minority students who pursued pharmacy education and became pharmacists, regardless of where they attended pharmacy school. The most compelling reason given by these students in choosing an out-of-state college/school was that they wished to leave their home, their parents, and/or the state. There are many more students in Chicago public schools who could benefit from participation in the Pathways to Pharmacy program, but due to space and budget constraints, our capacity is limited. Based on this, participation in the program may have been a significant factor in motivating students to pursue a prepharmacy curriculum in college and ultimately a career in pharmacy.

Limitations

The student selection process for the Pathways to Pharmacy program ensured that the students who participated already possessed the ability and potential to succeed in a rigorous academic domain. Given the exploratory nature of this investigation, we could not account for selection effects. As such, we are cautious in concluding that the students' high retention rate was solely the result of participation in the Pathways to Pharmacy program. Faculty members and other partners in the program were not interviewed to learn what they thought of the Pathways to Pharmacy program and the students who participated, and possible reasons for the students' successful socialization. The thorough screening of participants was based on a strategic enrollment management technique and may have resulted in the selection of a homogenous group of students in terms of their attitudes toward school, education, and high achievement.

There remains a lack of understanding and awareness among underrepresented minority students about the pharmacy profession. The pretest open-ended question response data showed that while most students said they were thinking of a career in the health professions, pharmacy was not the most mentioned. However, utilization of the Theoretical and Conceptual Framework Model for Success in Pathways to Pharmacy High School Program model proved to be successful. We encourage other pharmacy schools interested in exploring how to attract more underrepresented minority students into their programs to replicate the model we developed. A major highlight of the program was the continued student socialization well after the program ended. The establishment of the Pathways to Pharmacy Program Pre-pharmacy Club at UIC-COP afforded students opportunities to reunite with

Table 4. Chi-Square Test of Independence Between Pathways to Pharmacy Students' Interest to Pursue or Not to Pursue a Career in Pharmacy (N = 120^a)

PWP Group	Total No.	N _Y No. (%)	N _N No. (%)	N _{DK} No. (%)	P
2005-2008	Pretest	40 (33)	0 (0)	80 (67)	0.0001
	Posttest	88 (75)	10 (8)	20 (17)	

Abbreviations: PWP = Pathways to Pharmacy

Note: number response to interest in pharmacy: N_Y: yes, N_N: no, N_{DK}: don't know

^a 2 miss data responses for posttest

Table 5. 2005-2008 Pathways to Pharmacy Students' Responses to Questions (N=115^a)

Opinions	Number of Student Responses to Each Question
Most Meaningful Experience	
Participation in rounds with physicians and pharmacists	15
Shadowing different faculty preceptors	15
Assisting to package medications for patients	10
Visit to the neo-natal intensive care unit with preceptor	10
Experience at UIC satellite pharmacy	12
Working with the Drug Information Center with preceptors, an area of pharmacy they did not know before	11
Learning about disease and medications that was usually prevalent in minority communities and their families	9
Hands on experience at CVS/pharmacy stores	7
Mentoring by UIC faculty and 'retired' CVS/pharmacy pharmacists	6
UIC friendly environment	6
Realizing the importance of interaction with patients	6
Learning the importance of customer service and treating patients/customers with respect	5
Guest speakers particularly Mr. Stedman Graham	5
Tutorial in chemistry & calculus	3
Least Meaningful Experience ^a	
Public speaking activities	50
Working in groups	25
Some faculty lectures are too advanced for them	20
Daily commute to UIC	15
Lunch was not provided	5

Abbreviations: UIC = University of Illinois at Chicago

^a Total was 115 because 5 survey instruments were missing data for least meaningful experience.

some of their faculty preceptors and cohorts from the program. Club activities, which were structured using the Pathways to Pharmacy program model, allowed the students to continue to experience socialization in the areas of developmental and anticipatory expectations of pharmacy school and the profession. The faculty and student interactions, according to most students, were the defining moments, especially for those students who were still undecided about pharmacy. These types of socialization experiences may have been what were missing in other pathways programs.

In our semester tracking reports of participants' academic progress, we were not surprised to find that the students self-reported that they were academically competitive in college, with high GPAs. We hypothesized that through the program, the students had gained a realistic understanding of the academic rigors of succeeding in pharmacy school and the profession and were prepared accordingly. The continued informal advising from the college of pharmacy's faculty and staff also was helpful.

The use of an open-ended semi-structured survey instrument³⁵⁻³⁸ on which students were asked to describe their experience in the Pathways to Pharmacy program

and any significant factor(s) that may have influenced their decision to pursue or not pursue pharmacy as a career was revealing. This qualitative approach allowed us to capture detailed, context-rich data that served to clarify the subtleties and complexities of the students' experiences. This investigation was an attempt to offer a proven program model to other pharmacy and health profession colleges that are grappling with the issue of attracting more underrepresented minority students into their programs. In comparing summer high school programs, the UIC-COP Pathways to Pharmacy program appeared to be the only model that was developed with community partnership and support and that is grounded in socialization theory. The success of the program was possible due to the partnership and support of CVS/pharmacy, CPS, and CUCFL. Together, we created a model to hopefully assist other health professions program on how to increase a pharmacy pipeline that would be successful in pharmacy school and the workforce. A few of the program participants who preferred to pursue business and management undergraduate and/or graduate programs instead of pharmacy could be counted as successes for the program as well because the profession also needs more

underrepresented minorities in management positions in pharmacy-related industries.

There is still a paucity of empirical research on high school health career pathways programs for underrepresented minority students in the education literature. While there is evidence that many institutions offer summer programs for high school students every year, we still do not know the impact of these programs in the students' decisions to pursue careers in the areas to which they have been exposed. The lack of epistemological research in this area has made it difficult to draw meaningful conclusions as to whether the programs have achieved the desired effects. This investigation was an attempt at illuminating the inherent complexities of health career decision-making processes among underrepresented minority high school students. The authors hope that this study will help inform pharmacy schools on how to design a successful Pathways to Pharmacy high school program. Future studies need to delve into the uncharted aspects of engaging more underrepresented minority students in pharmacy beginning at the elementary school stage. One of the guiding principles for Healthy People 2010 for improving the health of minority populations is captured in the following quote "The future health of the nation will be determined to a large extent by how effectively we work with communities to reduce and eliminate health disparities between non-minority and minority populations experiencing disproportionate burdens of disease, disability, and premature deaths."³⁹

CONCLUSIONS

A comprehensive Pathways to Pharmacy program proved successful in preparing underrepresented minority high school students for the academic challenges and professional socialization required in pursuing a pharmacy education and a career in pharmacy. Colleges and schools of pharmacy should form alliances with health industry partners, public schools, and community workforce advocacy groups to address the problem of low numbers of underrepresented minority students in the pharmacy pipeline to serve as healthcare professionals in grossly underserved communities. There is a shared interest for all relevant stakeholders to forge these types of partnerships with the goal of preventing a large segment of the population from becoming permanently marginalized in the healthcare arena.

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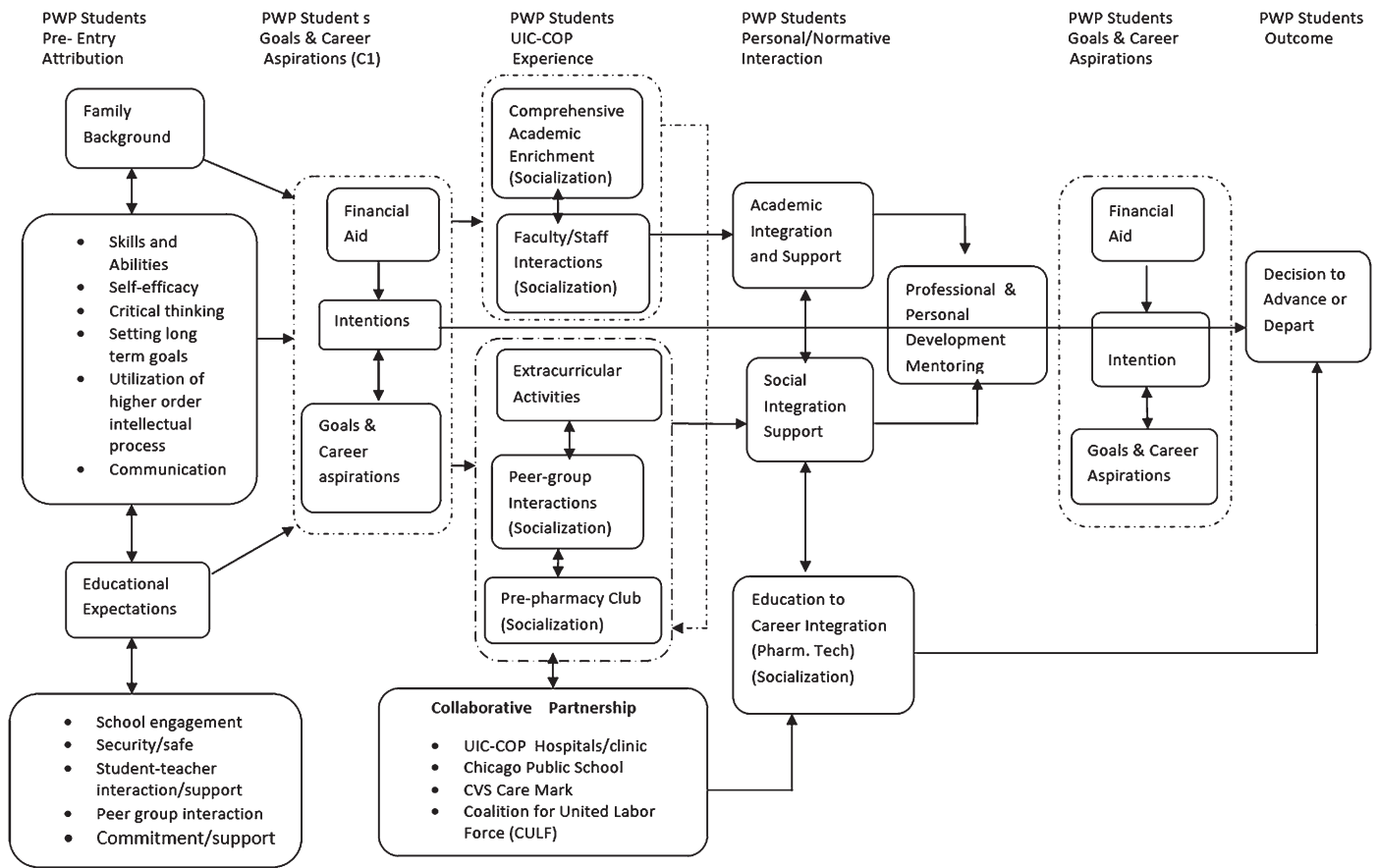
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Appendix 1.



Awé, C., Bauman, J. (2009). The Theoretical and Conceptual Framework Model for Success in Pathways to Pharmacy High School Program