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The Gateway Program: Ten-year Lessons about Outcomes and Admission Measures

ABSTRACT

The Gateway to Higher Education is a comprehensive program that provides selected minority students from five New York public high schools with rigorous high school preparation for college and professional careers in medicine, science, engineering, and technology. In existence for over ten years, the program has begun to accumulate solid outcomes data. The authors briefly describe the Gateway program and discuss students' graduation rates, career plans, and other outcomes. They then describe the correlation they have established between stu-

dents' scores on the Stanford mathematics test (a standardized test administered to all Gateway ninth-grade students) and their subsequent SAT scores. Given the correlation recently established by the Association of American Medical Colleges between SAT scores and MCAT scores, this information provides another useful—and early—predictor of the future success in medical school of underrepresented minority students. *Acad. Med.* 1998;73:1169–1171.

Throughout the country there are many programs designed to encourage underrepresented minority students to pursue careers in science and medicine, and to ensure that these students are well prepared for the rigors of advanced academic coursework. As the debate about affirmative action continues, such enrichment programs may become even more crucial to ensuring a diverse student body at our universities and medical schools.

To meet this challenge, those of us who implement enrichment programs must ensure that we are serving our students well. Measuring outcomes will become increasingly important, as will identifying predictors of academic success. In these respects, the particular program with which we are involved, the Gateway to Higher Education, is at an advantage: our program has been in place for over ten years now, and we have begun to accumulate solid data on the success of our students. Most recently, we have also established a

correlation between one of Gateway's baseline performance measures and its students' subsequent SAT scores. This information may help not only enrichment programs such as ours but also admission committees to determine which students are likely to succeed in college and medical school.

THE GATEWAY PROGRAM

The Gateway to Higher Education is a comprehensive public high school program that provides minority students with rigorous high school preparation for college and professional careers in medicine, science, engineering, and technology.¹ Each year, the program admits approximately 200 ninth-grade students in five New York City public schools; currently, over 800 students are enrolled in Gateway, with a demographic breakdown of 60% female and 40% male; 62% African American, 19% Hispanic, 13% Asian American, and 5% other. To be admitted, students must be performing at least at grade level in reading and math, have an overall academic average of 80 or more in their junior high school coursework, and have demonstrated high motivation through academic performance and regular attendance.

Gateway students have a broad spectrum of academic preparation in reading and mathematics, with scores ranging

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from the 50th to the 99th percentile on the Stanford mathematics and reading tests, standardized tests administered to all Gateway ninth graders. The results of the Stanford tests are used by Gateway as a baseline for measuring students' future performances.

The Gateway program's premise is that underrepresented minority students can be successful in science majors at competitive senior colleges if they enter high school with reading and mathematics scores at least at grade level and if they engage in rigorous pre-college preparation. Gateway students' academic performance is supported by tutorial support and small-group study in all subjects, an extended and enriched school day, and academic summer experiences in research laboratories and universities, as well as trips to theater performances, concerts, and museums. They graduate from high school having taken an average of three advanced placement courses, which are encouraged as preparation for college and science-oriented careers. The annual cost of the program is only \$1,600 per student more than the usual cost. This \$1,600 is added to the normal amount budgeted for each Board of Education student in New York City public schools. It is a small cost for the very substantial rewards and benefits reaped by the students, the school system, and society.

CHARTING GATEWAY'S SUCCESS

The success of the Gateway program can be measured in a number of ways (and some of its achievements, of course, cannot be quantitatively measured). Here we consider three areas: students' high school graduation rates, successful admission to college, and plans for science-related careers.

Graduation rates. In 1996, the Education Development Center, a private research organization, conducted an outcomes study of the Gateway program.² In the study, 136 Gateway students were matched to 136 New York City public high school students who were not in the program. They were matched by high school entry date, reading and mathematics percentiles, ethnicity, and gender. The results showed that the Gateway students were four times more likely to pass the chemistry section of the New York State Regents' chemistry examination and five times more likely to pass the Regents' physics examination than the control group students, and twice as likely to pass the Regents' English examination. More of the Gateway students (93%) than the control students (73%) graduated from high school, despite the fact that the Gateway students were required to complete a more rigorous curriculum. The study showed clearly that the Gateway Program was successfully preparing public school minority students for science careers and graduating a higher proportion of its students.

College admission and graduation. In 1992, we began to give questionnaires to Gateway students in the ninth and

twelfth grades (that is, in their first and last years in the program) and again in the first and fourth years of college. We wanted to track their college plans, career plans, college coursework, academic performances, career plans, and plans for graduate study.

A total of 435 students entered Gateway between 1986 and 1988, and 395 (90%) remained in Gateway and graduated from high school. Of the 40 Gateway students who did not remain in the program, half moved out of the area and half left because of academic difficulty. Virtually all of the graduates (385 of 395) enrolled in four-year colleges, and 305 of them (79%) answered follow-up questionnaires in their fourth years of college. Half of the respondents graduated from college in four years, a further 24% graduated in five years, and only 8% said they had dropped out of college. (The remaining 12% did not answer the question.) Thus, 89% of Gateway students who entered the program (in ninth grade) in 1986–1988 entered college, compared with a statewide average of 35% of minority students.³ Further, whereas at least 66% of the Gateway students graduated from college within five years, only 14% of New York's minority high school graduates did so.³ From 1992 to 1995, the mean SAT score for all Gateway graduates was 982. African American Gateway students had a mean SAT score of 967, whereas the national mean for African Americans was 741.

Career Plans. The survey responses from 699 Gateway high school seniors from the years 1992–1996 indicated that 53% wished to pursue doctoral degrees, with 29% interested in the MD and 24% in the PhD; 27% planned to pursue master's degrees; 13% planned bachelor's degrees; 4% wished to earn law degrees; and 4% were still undecided. Only two students in this group of 699 had educational aspirations below the bachelor's degree level.

In follow-up surveys in the fourth year of college, 59% of Gateway alumni from the first three graduating classes indicated that they were pursuing science-based careers, including medicine, health, engineering, and computer science. With regard to degree aspirations, 30% hoped to earn doctoral degrees, with 17% planning PhDs and 13% anticipating MDs. Thirty-eight percent planned master's degrees, 6% intended to get law degrees, 6% planned to finish their bachelor's degrees and look for employment, and 20% were still undecided about graduate education.

PREDICTING OUR STUDENTS' FUTURE SUCCESS

Preliminary results from a study being conducted by us and the Association of American Medical Colleges (AAMC) indicate that there is a high correlation (.75) between scores on the Scholastic Aptitude Test (SAT) and scores on the Medical College Admission Test (MCAT).⁴ More particularly, the study shows that underrepresented minority students who scored 1100 or higher on the SAT were more suc-

Table 1

Percentile Score	SAT Score					
	<900		900-1099		≥1100*	
	No.	(%)	No.	(%)	No.	(%)
<75	130	(52.2)	99	(39.8)	20	(8.0)
75-90	46	(20.1)	139	(60.7)	44	(19.2)
>90	9	(3.3)	110	(40.7)	151	(55.9)
TOTAL	185		348		215	

*Scores of 1100 and above have been positively correlated with higher MCAT scores and improved chances of acceptance into medical school.

successful in gaining admission to medical school, while students scoring between 900 and 1100 were moderately successful.

In order to project a profile of ninth-grade students who might attain SAT scores of 1100 or better and therefore be more likely to gain admission to medical school, the SAT scores of 748 Gateway students were correlated with their scores on the Stanford mathematics test that they all took as ninth graders (see Table 1). The students scoring in the top 10% on the Stanford test were three times more likely to score 1100 or higher on the SAT (56% vs 19%) as were the students who scored in the 75th-90th percentiles.

If students are very well prepared (90th percentile or higher) in mathematics upon entering the Gateway program, they have a significantly stronger chance of achieving a high school record that will ultimately result in medical school admission. Among all Gateway students, 75% scored 900 or higher on the SAT. Based on the correlation between the SAT and the MCAT—the correlation shown in the AAMC study—it appears that many Gateway students, with continued hard work, can potentially enter medical school. In fact, eight students (7%) of the first Gateway graduating class went on to enter medical school; the program's continuing goal is to have 15% of its graduates enter medical school.

This information may be useful not only for enrichment programs for underrepresented minority students but for all secondary schools wishing to encourage their students to pursue science careers. It should also spur primary school and middle-school educators to provide the academic courses and standards of excellence that will ensure that more students enter high school with solid backgrounds in science and math. As we have shown, those students who score well on such standardized measures on the Stanford mathematics

test have a good chance of moving successfully into college and medical school. Those who do less well nonetheless have a strong likelihood of succeeding in college and having careers in science and other health professions, and with intensive preparation may achieve scores that can lead to medical school.

MEETING THE CHALLENGE

Gateway's high academic standards are demonstrated by the high proportion of Gateway students who have earned New York State Regents' diplomas upon completing four years of rigorous courses in science, mathematics, English, and foreign languages—62%, as compared with fewer than 10% of all New York students who enter the ninth grade.⁵

Gateway has been successful in educating a broad range of students, and we have been invited by the AAMC's national *Project 3000 by 2000* to present our model and accomplishments at meetings of other professionals from high schools and medical schools around the country. The shared goal of the AAMC and Gateway is to increase significantly the numbers of underrepresented minority students entering U.S. medical schools by the year 2000. In a national AAMC database of minority high school students interested in pursuing medicine and health careers, 47% of the New York State high school students listed were in the Gateway program. As mentioned earlier, we have achieved this success at a minimal additional cost of only \$1,600 per student per year.

Attempting to achieve racial and ethnic diversity in all professions has always been a struggle, but the need grows more urgent as we prepare to meet the challenges of 21st-century America. As underrepresented minorities face new barriers to achieving equal opportunities in the medical profession, educators at all levels—primary, secondary, and tertiary—must work even harder to provide all students with the chance to succeed, particularly in the increasingly competitive fields of science and medicine.

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