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THE ANDREW HILL HIGH SCHOOL MEDICAL-HEALTH PROFESSIONS MAGNET PROGRAM: A SUMMATIVE EVALUATION

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INTRODUCTION

African Americans, Hispanics, and Native Americans are underrepresented in health professions, and minority underrepresentation is growing worse. In response, the Henry J. Kaiser Family Foundation (KFF) funded the Andrew Hill Medical-Health Professions Magnet Program in San Jose, California. The main goals of this magnet program were to increase the number of interested students, especially traditionally underrepresented minority students, who attend college and who pursue health-related careers.

The KFF contracted with Mathematica Policy Research, Inc., to evaluate the Andrew Hill magnet program. The evaluation has two main components: a documentation of program implementation and operations and analyses of program participation and outcomes. This report synthesizes the findings of the evaluation and places the outcomes of the Andrew Hill magnet program in the context of other high school programs designed to increase minority student participation in health professions.

PROGRAM BACKGROUND

Certain minority groups--African Americans, Hispanics, and Native Americans--have historically been underrepresented in health profession schools and in health professions. In 1964, only 2.2 percent of students in the nation's allopathic medical schools were African American. By 1974, about 10 percent of all medical students were from one of the three underrepresented minority groups, which made up about 16 percent of the U.S. population (Nickens et al. 1994). Students from these groups made up 12 percent of the total 1995 medical school enrollment--less than half of their total percentage (about 21 percent) of the U.S. population (AAMC 1996). Rates are similar in other health professions. During the 1982-1983 academic year, underrepresented minorities made up 19 percent of the U.S. population and only 4.8 percent of students in osteopathy, 8.9 percent of students

in dentistry, and 4.4 percent of students in optometry (Nickens and Ready 1994). In 1995, less than 10 percent of all psychologists were minorities (APA 1995).

Minority representation in the health professions is important for the promotion of racial equality and for the well-being of the nation's minority population. As the minority population continues to increase, researchers predict that within the next 25 years minority youth will make up 40 percent of the school-age population. Society needs to draw students from these racial and ethnic groups into health professions in order to ensure the future viability of these professions (Nickens and Ready 1994). In addition, research studies have shown that minority health care professionals are more likely than white professionals to care for the poor and other minorities. For example, one study of California physicians found that African American physicians "cared for nearly six times as many black patients as did other physicians, on average, [and] Hispanic physicians cared for nearly three times as many Hispanic patients as did other physicians." African American and Hispanic physicians also tended to practice in poorer areas than non-Hispanic white physicians (Komaromy et al. 1996). Although there is only anecdotal evidence suggesting that minority doctors actually improve the health outcomes of the poor, more minority doctors are needed to care for the nation's growing minority and poor communities.

Increasing the participation of minorities in health professions has been a goal of the United States government and medical schools over the last 30 years. Nickens et al. (1994) describe three phases in the movement to increase the racial and ethnic diversity in medical schools. Phase 1, from the late 1960s to the mid-1970s, saw an increase in the number of minority medical school students as the civil-rights movement heightened awareness of racial injustices. The affirmative action policies and programs of the Association of American Medical Colleges (AAMC) and the federal government served to increase minority-group enrollment in medical colleges during this phase.

During phase 2 (1974 through 1990), the population of the minority groups increased faster than their enrollment in medical school, resulting in stagnation; there was little increase in the percentage of minorities entering medical school. The AAMC's Project 3000 by 2000 kicked off the third phase in 1990. The project's goal is to enroll 3,000 underrepresented minority students in medical schools each year by the year 2000 (there were 1,584 minority entrants in 1991). The advent of this project was followed by a 27 percent increase from 1990 to 1993 in the number of underrepresented minorities enrolling in medical school (Nickens et al. 1994). Despite these programs and the latest increases in minority student enrollment, "it is far from enough even to approach a goal of parity with the minority population in the next 50 years, given the expected growth of that population" (Rivo and Kindig 1996).

The federal government, medical colleges, and foundations have been the main funders of programs to encourage minorities to enter health professions and to support minorities who enter health profession schools and careers. The Bureau of Health Professions within the Health Resources and Services Administration at the Department of Health and Human Services has made increasing minority representation in health professions one of its main goals and runs several programs to promote minorities in health professions. The Centers of Excellence program helps historically black colleges and universities and health professions schools serving a significant number of underrepresented minority students to recruit minority applicants and provide activities to support their academic performance. This program requires grant recipients to involve high schools in their centers. The Health Career Opportunity Program (HCOP) targets minority high school seniors and college students who express interest in entering a health-related profession. Through this program, students receive support services designed to enhance their academic performance and facilitate their entry into a health professions school. In 1991, 49 medical schools

and more than 100 professional schools sponsored HCOP programs (Ready and Nickens 1994). Partnerships between schools and communities were funded in 1996 under the Partnerships for Health Professions Education, a three-year demonstration program, to establish a "seamless pipeline" for minority students seeking careers in health professions.

The AAMC has encouraged the participation of medical schools in the recruitment and education of underrepresented minority students, starting with the creation of its Office of Minority Affairs in 1969 and, more recently, its Project 3000 by 2000. Since the beginning of this project, many more medical schools have joined the effort to promote minority students' entry into health professions schools and careers. Currently, a Project 3000 by 2000 coordinator is in place at every medical school in the country (Nickens et al. 1994).

Several foundations have also taken action in response to the continued underrepresentation of minority groups in health professions. For instance, KFF funded the More Minorities in the Health Professions (MMHP) program. Under this program, the KFF wanted to fund high school projects that:

- Begin intervening at the junior high level
- Involve parents
- Expose students to health professions
- Enlist a range of community resources to work together to achieve the project's goals
- Involve a community-based organization to establish oversight and coordination of the participation organizations

Through this program, the foundation funded three high school demonstration projects. Other foundations, such as the Josiah Macy, Jr., Foundation, have also been important funders of programs to promote minorities in health professions.

In general, these organizations fund or implement programs that intercede at one of five points in students' academic careers to encourage and/or provide them with the support to pursue a health professions career. Some programs provide academic support and career awareness to students in high school or earlier, so that the students will acquire the necessary academic credentials and motivation to enroll and do well in college and then a health professions school. Other programs support students' transition from high school to college. College and medical school programs sustain minority students' interest in health professions and provide students with support during their college undergraduate years. Postbaccalaureate programs enroll students who were not accepted into medical school on their first attempt or decided late in their college career to pursue a health career. These programs enable students to obtain the necessary credits and academic experience to be accepted into and later succeed in medical school. By supporting students along the "pipeline" that feeds into a career in a health profession, it is hoped that all of these programs will increase the number of minority health-care professionals.

This paper focuses on one high school program--the Andrew Hill Medical-Health Professions Magnet Program--funded through the KFF's MMHP program. Like similar high school programs, the Andrew Hill magnet program was designed to expose students to health careers, motivate students to enroll in college following high school, and provide them with the academic background necessary to take the college courses needed for careers in health professions. In the next two sections, we describe the magnet program and summarize the program findings from the study conducted by Mathematica Policy Research, Inc. (MPR). Then, we place these findings in the context of findings from other high school programs, including Project ACHIEVE, which was also funded by the Kaiser Foundation and evaluated by MPR, to better understand the achievement of the Andrew Hill magnet students.

THE ANDREW HILL HIGH SCHOOL MEDICAL-HEALTH PROFESSIONS MAGNET PROGRAM

In response to the underrepresentation of minorities in the health professions, KFF funded the Andrew Hill High School Medical-Health Professions Magnet Program in San Jose, California. The long-term goal of the Andrew Hill magnet program was to increase the number of youths, especially traditionally underrepresented youth, who entered health professions requiring a college degree. In the shorter term, the program's goals were to:

- Provide an enriched four-year learning experience consisting of both academic knowledge and technical skills that will prepare students for high school graduation
- Help students--especially underrepresented minorities--to raise their aspirations
- Give students information about and exposure to numerous health professions
- Bring together students from various ethnic and racial backgrounds and allow them to work together in an environment of cooperation and collaboration
- Increase significantly the number of underrepresented minority students who enter and complete four-year college health professions programs

Andrew Hill High School's Medical-Health Professions Magnet Program began serving students in the 1989-1990 school year as part of the districtwide magnet program to promote desegregation, provide special opportunities for students, and increase the participation of underrepresented minorities in college preparatory programs. The program was open to all interested students; eligibility requirements were not based on academic ability. According to school and district enrollment figures, the Andrew Hill magnet program began with 94 students in grade 9 during the first school year and increased to 461 students in grades 9 through 12 during the 1992-1993 school year. By that school year, about one-fourth of Andrew Hill High School students were enrolled in the magnet program, and about 35 percent of the magnet students were transfer students

from other high schools in the district. The program experienced little transition as students moved through high school.

The Andrew Hill magnet program provided an academic curriculum and a series of practical experiences exposing students to various aspects of health professions. During the school day, magnet students had access to a computer laboratory and took special science and health courses offered only to program participants. For the special courses, magnet program staff members and teachers invited guest speakers, who described their jobs in the health industry, and the curriculum incorporated issues and practical applications from health professions. Other organizations hosted or sponsored activities for magnet students outside of school. The Center for Health Careers at San Jose State University (SJSU) sponsored on-campus activities primarily for sophomores to encourage them to enter and complete higher-education health-career programs, and several health institutions hosted students in job shadowing or other work-based activities. Many magnet students also participated in the Valdes Summer Math Institute, a summer mathematics enrichment program funded in part by the East Side Union High School District. Table 1 provides a description of the individual magnet program activities.

Participation in the magnet program was flexible, and students who enrolled in the program were considered magnet program participants regardless of the mix of services they received. They were not required to participate in any particular mix of magnet program components in order to be considered magnet students. Staff members expected students to enroll in the basic magnet classes, including the magnet science and physical education classes, but scheduling conflicts or students' limited English language skills sometimes forced participants to enroll in nonmagnet courses. Students could decide not to participate in other magnet components, such as the health professions

TABLE 1

COMPONENTS OF THE ANDREW HILL
HEALTH PROFESSIONS MAGNET PROGRAM
(1993-1994)

Activity	Description
Science Courses	Magnet students were grouped together for two science classes--Introduction to Science and Biology. Students were encouraged to take other science classes during high school.
Health Courses	Two health classes--Nutrition and Health and Exploration in Applied Technology--were available only to magnet students. Students were encouraged to take health-related electives that were open to all students.
Physical Education Course	Tenth grade magnet students were grouped together for physical education, which included a classroom element and a physical activities component. The course included a specialized curriculum in anatomy and physiology, CPR, sports medicine, and athletic training.
Computer Laboratory	Magnet students had exclusive use of a computer lab, which maintained word processing, spreadsheet, and science software.
Club Med	This health professions club sponsored a variety of health-related activities, including volunteering at health meetings and fairs, organizing and sponsoring a blood drive, and distributing information about AIDS. The club was open to all Andrew Hill students.
Guest Speakers	Magnet program staff members recruited individuals who worked in health-related fields to speak to the magnet classes.
Field Trips to Colleges and Health Institutions	The magnet program sponsored a variety of field trips to medical institutions, colleges, and universities. Some trips were taken by students enrolled in particular magnet classes; others were available to all magnet students.
San Jose State University (SJSU) Activities	SJSU faculty and students provided a range of activities to magnet students, including presentations about health careers, tours of the campus, and after-school peer tutoring.
Valdes Summer Math Institute	The institute was a summer mathematics enrichment program that prepared students in the sixth grade and above for academic-track high school mathematics courses. It was open to all students from San Jose, but preference was given to students attending Andrew Hill High School, minorities, and students judged as needing the most help. The magnet program recruited students from among Valdes enrollees.

TABLE 1 *(continued)*

Activity	Description
Shadowing Experiences, and Volunteer and Paid Work Experiences	The magnet program offered limited opportunities for students to participate in shadowing, paid work, and volunteer work experiences with health professionals. Only juniors and seniors were eligible for most magnet-sponsored opportunities, and they were required to apply to participate.
Mentors and Conferences	A number of local community hospitals and organizations sponsored special activities--such as mentoring and attendance at health conferences for magnet students.

SOURCE: Kisker and Dunstan, 1994.

CPR = cardiopulmonary resuscitation; AIDS = acquired immunodeficiency syndrome.

club or activities at SJSU, or may not have been accepted for others, such as a paid work experience at a health facility.

The Evaluation

The KFF contracted with MPR to evaluate the Andrew Hill magnet program. The evaluation had several components, including a documentation of program implementation and operations and analyses of program participation and outcomes.[1] To document program implementation and operations, MPR staff members visited the magnet program in March 1993, and spoke with school and program staff members and participating students.

To assess high school and postsecondary outcomes, we collected longitudinal data for two cohorts of magnet students. Students from the first two magnet program classes (students from the classes of 1993 and 1994) were surveyed each spring beginning in their senior year and continuing until they were sophomores and juniors in college, respectively (or would have been had they entered college the year following high school and progressed at the usual pace). Thus, students from the class of 1993 completed surveys in four successive years--1993, 1994, 1995, and 1996--whereas students from the class of 1994 were asked to complete surveys for three successive years--1994, 1995, and 1996. Students' school records were also collected for information about students' background characteristics and high school academic activities.

Response rates to the senior and postsecondary surveys were very high for both classes. Overall, 94 percent of students completed the senior survey, and more than 90 percent of students

[1]Three earlier reports provide results from the evaluation: one report details program operations and implementation (Kisker and Dunstan 1994); a second report describes the program's early outcomes (Kisker 1995a); and a third report provides results from the study of the postsecondary outcomes of magnet students (Rosenberg and Kisker 1997).

completed the first two postsecondary surveys (Table 2). By their third year out of high school, 82 percent of the 1993 sample completed the postsecondary survey.

Magnet Student Characteristics

Magnet program seniors in the classes of 1993 and 1994 were ethnically diverse and likely to come from families with low incomes and little education. Most of the magnet program participants in the two cohorts were nonwhite, and about one-third belonged to minority groups underrepresented in medical and health professions. One-fourth of magnet students were Hispanic, just over half were Asian American, 12 percent were white, 4 percent were African American, and 4 percent came from other backgrounds (Figure 1). Magnet students in the class of 1994 were more likely than those in the class of 1993 to be Hispanic and less likely to be Asian American. This ethnic diversity approximates the diversity of all seniors attending Andrew Hill High School.

Many magnet students also came from economically disadvantaged families. About half of all magnet students came from families receiving some kind of public financial assistance (welfare, food stamps, unemployment insurance, and/or free or reduced-price school lunches). A significant proportion of non-welfare households had low incomes and qualified for the National School Lunch program. Altogether, 42 percent of seniors reported receiving free or reduced-price lunches.

Many students' parents probably had no direct experience with applying for college admission and financial aid. The parents of a majority of magnet students had no education beyond high school, and many did not have a high school diploma. Hispanic and Asian American students were least likely to have parents who had any education beyond high school (35 percent and 43 percent, respectively). Approximately 40 percent of magnet students came from recent immigrant or refugee families, and thus, their parents' familiarity and understanding of the U.S. education system was probably relatively limited.

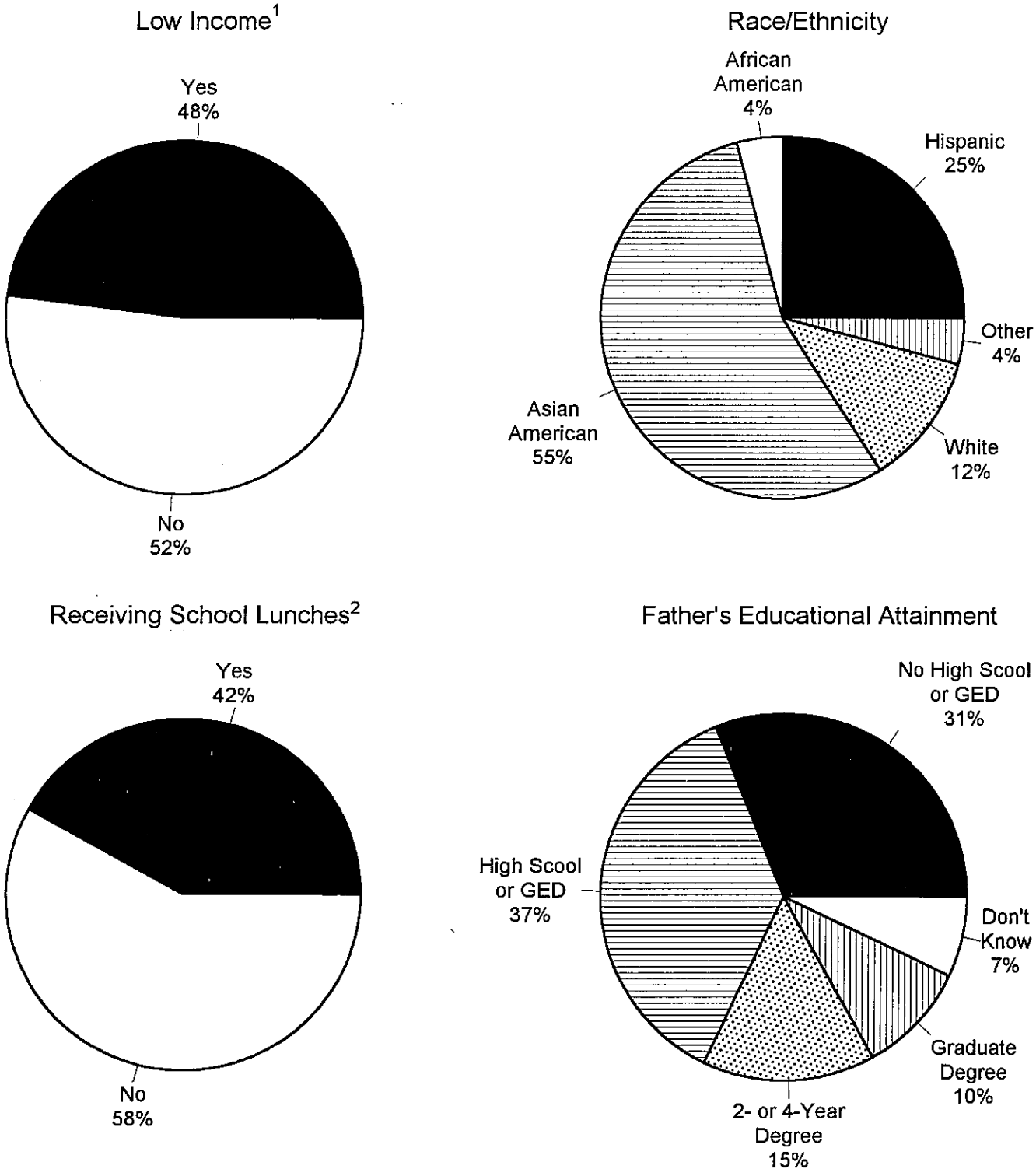
TABLE 2

SAMPLE SIZES AND RESPONSE RATES

	Class of 1993	Class of 1994	Both Classes
Senior Survey (1993 and 1994)			
Total Number of Students	84	96	180
Total Number Interviewed	79	91	170
Response Rate (Percentage)	94	95	94
First Postsecondary Survey (1994 and 1995)			
Total Number of Students	79	91	170
Total Number Interviewed	77	86	163
Response Rate (Percentage)	97	95	96
Second Postsecondary Survey (1995 and 1996)			
Total Number of Students	79	91	170
Total Number Interviewed	72	85	157
Response Rate (Percentage)	91	93	92
Third Postsecondary Survey (1996)			
Total Number of Students	79	—	79
Total Number Interviewed	65	—	65
Response Rate (Percentage)	82	—	82

FIGURE 1

SELECTED CHARACTERISTICS OF MAGNET PROGRAM PARTICIPANTS



[1]The student reported that his or her family received public assistance, food stamps, or unemployment insurance.

[2]The student received free or reduced-price school lunches.

ANDREW HILL MAGNET PROGRAM OUTCOMES

The evaluation of the Andrew Hill Magnet program had three components: (1) an implementation study; (2) an early outcomes study that focused on students as they were about to graduate from high school; and (3) a postsecondary study that followed students during the two years following high school. This section integrates the findings from the three studies and presents overall findings of the magnet program.

Students Had Positive Experiences in the Magnet Program

In group interviews, magnet students were very enthusiastic about the magnet program and largely found it to be what they had expected when they applied and decided to attend.[2] The students especially liked the job shadowing experiences, field trips, and guest speakers. These positive assessments of the program were confirmed in the survey of magnet program seniors and the postsecondary surveys. One year after leaving high school, almost 80 percent of students from both classes reported having had somewhat positive or extremely positive experiences in the magnet program (Table 3).

Looking back, students credited the program with teaching them about health careers, encouraging them to apply for and enroll in college, and motivating them to do well in school. Thirty-seven percent of the students believed that the program was extremely successful at providing them with a greater understanding of the opportunities in the health field, and 31 percent felt that the program was extremely successful in helping them develop useful job skills. Students felt that the program was least successful in helping them find jobs after high school, reflecting the program's emphasis on encouraging students to pursue higher education.

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[2]The group interviews were not limited to students from the classes of 1993 and 1994.

TABLE 3

STUDENTS' EXPERIENCES IN THE MAGNET PROGRAM
(Percentages, Unless Otherwise Noted)

	Class of 1993	Class of 1994	Both Classes
Students Who Stated That Overall Magnet Program Experiences Were:			
Extremely positive	21	30	26
Somewhat positive	51	53	52
Neither positive nor negative	25	15	20
Somewhat negative	3	2	3
Extremely negative	0	0	0
Students Who Believed That Magnet Program Was Extremely Successful at:			
Teaching about different health careers	25	48	37
Teaching how to get into college	20	37	29
Teaching skills that are useful in college	11	28	20
Helping to apply for financial aid	13	20	17
Helping to find a job after high school	3	3	3
Helping to develop skills that are helpful in jobs	25	37	31
Helping to develop skills that are useful in health jobs	17	18	18
Providing motivation to do well	40	59	50
Providing encouragement and emotional support	37	48	43
Rating of Program's Success Across All Nine Objectives			
Not at all successful (0-0.5)	22	16	19
Somewhat successful (0.5-1.5)	67	58	62
Extremely successful (1.5-2)	10	27	19
Average Rating (0-2 scale)[a]	0.91	1.10	1.01
Sample Size	**76**	**83**	**159**

SOURCE: 1994 and 1995 Andrew Hill Magnet Program Postsecondary Surveys, Mathematica Policy Research, Inc.

NOTE: In the 1994 and 1995 surveys, one student from the class of 1993 and three students from the class of 1994, respectively, reported that they had not participated in the magnet program. Data on these students are excluded from the table.

[a]Students were asked whether the program was not at all successful (0), somewhat successful (1), or extremely successful (2) in reaching each of the nine program objectives. Students' responses were averaged over all nine objectives.

Experiences Improved for the Second Cohort of Students

Students in the class of 1993 had somewhat different magnet program experiences from students in the class of 1994. As the magnet program matured, it offered additional health courses, so that significantly more students from the class of 1994 than students from the class of 1993 took magnet health courses. Over time, project resources for other activities, such as job shadowing and mentoring, decreased, and there were fewer opportunities for students in later classes to participate. Thus, an analysis of students' program participation showed that, on average, students from the two classes participated in the same number of program components, although the composition of their experiences shifted.

Compared with students in the class of 1993, students in the class of 1994 gave the magnet program higher marks for achieving its primary objectives in the first postsecondary survey after high school (Table 3). Controlling for other differences, class of 1994 students were significantly more likely than class of 1993 students to consider the program extremely successful at teaching about different health careers, teaching how to get into college, teaching skills that are useful in college, and providing motivation to do well.

Students in the 1993 class may have had fewer positive experiences because they were in the first class of program enrollees. In their general comments about the magnet program, several students from the class of 1993 noted that they had felt like "guinea pigs." While implementing the program and learning from their experiences with the first class, staff members probably improved the program, thus making it a more positive experience for subsequent classes.

Participation in the various magnet program components varied by other factors. Male and Hispanic students participated in fewer magnet program components than female and non-Hispanic students. Greater participation by female students may reflect their stronger interest in health

professions and staff attempts to give priority to interested students when opportunities were limited. Students who had attended the Valdes Summer Math Institute participated in more components than students who did not attend the summer program, perhaps reflecting greater motivation among students in the former group. Institute enrollees already had signaled their desire to improve their mathematics skills and their commitment to furthering their education.

Greater participation in some program components by certain subgroups of students resulted from program policies. Some program activities, such as certain job shadowing opportunities, were open only to minority students. Thus, after controlling for other differences, white students were significantly less likely to have shadowed a health professional than nonwhite students. White parents and students resented their exclusion from these opportunities. In response to an open-ended question in the 1996 postsecondary survey, one student stated, "The shadowing [component] should be opened to everyone. The program was not fair."

Asian American and male students tended to report more negative magnet program experiences than did their non-Asian American and female counterparts. Students from low-income families (as indicated by their participation in the National School Lunch Program) and students whose parents were more highly educated tended to be less critical of the program.

Students Enrolled in Postsecondary Institutions at High Rates and Persisted at High Rates

Consistent with their plans for postsecondary education when they were in high school, magnet students enrolled in college at very high rates. In their senior year, 92 percent of students expected to attend college, and the vast majority expected to complete a four-year college program. Hispanic students expected to complete less education than other magnet students (78 percent expected to attend college). In contrast, only 69 percent of high school seniors nationally expect to attend college (NELS 1992).

Within their first year after high school, 89 percent of magnet seniors enrolled in either a two- or four-year college program (Table 4). Most (83 percent of all students) enrolled by the fall following their senior year, and about half of all students enrolled in a four-year college. These enrollment rates are higher than both the college attendance rate for all Andrew Hill High School students (70 percent) and the national rate at which high school graduates aged 16 to 24 years enrolled in college by the October following their high school graduation (62 percent) (NCES 1996).

Magnet students demonstrated high college persistence rates. Of all magnet students, 78 percent reported attending the same college consistently during the two years following high school (Table 5). The remaining students who entered college during the first year (11 percent of all students) interrupted their education at some point during the two years, either by dropping out of school or by transferring to a different school. About three percent of students enrolled in school during the first year attended school continuously but switched schools during the fall of their second year. The remaining students enrolled in the first year (eight percent of all students) left school sometime during the two years. Of these, more than one-third left school before completing their first year of college but returned during the second year.

Students who began college in a four-year school exhibited more stability in their college experience than did those in two-year programs. Nearly all students (91 percent) who attended a four-year program during their first year remained in the same four-year school through their second year. Three percent left but returned to school in the second year and continued attending. Students who started a two-year school during their first year exhibited somewhat less stable experiences. Eighty-three percent attended college consistently in both years. Eleven percent left in the first year, with only a few returning in the second year.

TABLE 4

COLLEGE ENROLLMENT
(Percentages)

	Magnet Students				
	Class of 1993	Class of 1994	Both Classes	All Andrew Hill Students[a]	Current Population Survey[b]
Enrolled in College	91	88	89	70	NA
Enrolled by October After High School Graduation					
In college	81	85	83	70	62
In two-year institution	35	34	34	45	21
In four-year institution	45	51	48	25	41
Sample Size	**77**	**86**	**163**	**NA**	**NA**

SOURCE: 1994 and 1995 Andrew Hill Magnet Program Postsecondary Surveys, Mathematica Policy Research, Inc.; National Center for Health Statistics, 1996.

NOTE: Percentages may not sum to 100 percent because of rounding.

[a]Enrollment rates for all Andrew Hill High School students reflect enrollment rates reported by the school's guidance office for the class of 1994.

[b]Enrollment rates from the 1994 Current Population Survey are for students aged 16 to 24 years who entered college by the October after their high school graduation.

NA = not available.

TABLE 5

COLLEGE EXPERIENCE DURING THE FIRST TWO YEARS OUT OF HIGH SCHOOL
(Percentages)

	Class of 1993	Class of 1994	Both Classes
Enrollment in College			
Attended consistently in both years	80	78	78
Attended consistently, switching schools	5	1	3
Attended in year 1 and left	3	4	4
Attended in year 1, left, returned in year 2, and attending	5	0	2
Attended in year 1, left, returned in year 2, and left	0	1	1
Attended through year 1 and left in year 2	0	3	1
Began attending in year 2	5	5	5
Never attended	3	8	6
Four-Year Status			
Attended in both years	52	51	51
Attended in year 1 and switched to two-year in year 2	3	1	2
Attended in year 1 and switched to vocational training in year 2	0	1	1
Began four-year in year 2 (attended nothing previously)	2	0	1
Never attended	43	47	45
Two-Year Status			
Attended in both years	39	27	32
Attended in year 1 and switched to vocational training in year 2	0	3	1
Switched from four-year in year 1 to two-year in year 2	0	1	1
Switched from training in year 1 to two-year in year 2	2	3	2
Attended in year 1 and attended nothing in year 2	3	5	4
Began two-year in year 2 (attended nothing previously)	0	3	1
Never attended	56	59	58
Sample Size	**70**	**82**	**152**

SOURCE: 1994, 1995, and 1996 Andrew Hill Magnet Program Postsecondary Surveys, Mathematica Policy Research, Inc.

NOTE: The table includes data on students who completed the postsecondary survey in each of the first two years after high school graduation. Percentages may not sum to 100 percent because of rounding.

Receipt of financial assistance also appeared to be a stabilizing factor in students' college careers. Controlling for other differences, students who received financial assistance to attend college in the first year after high school were more likely to be continuously enrolled than were students who did not receive financial assistance. Students who enrolled in and then left college during the follow-up period confirmed that finances disrupted their college education by citing "financial problems" as a major reason for leaving college.

Students from the class of 1993 continued to have high college persistence rates into their third year of college. Of those who completed all three postsecondary surveys, 87 percent attended school consistently during the three-year period. Almost two-thirds of these students (or 55 percent of all class of 1993 students) attended the same school for all three years. The remaining third attended school continuously but switched schools at some point during the three-year period. Most students who had enrolled in a four-year college out of high school were enrolled in a four-year college in their third year.

Students Finished the Magnet Program with Strong Preparation for Postsecondary Education

Consistent with the magnet program's emphasis on taking mathematics and science classes needed to prepare for postsecondary education leading to health professions, high proportions of magnet students completed advanced mathematics and science courses at Andrew Hill High School. During their senior year, the vast majority of magnet students enrolled in mathematics and science courses. More than 80 percent of magnet students enrolled in a mathematics class, most in algebra or an advanced mathematics class such as geometry, math analysis, or calculus. By the time they graduated, 89 percent of magnet students had completed at least one mathematics course beyond algebra. Nearly one-half (45 percent) completed calculus, the most advanced mathematics course offered at Andrew Hill.

During their senior year, most magnet students (87 percent) enrolled in a science course. Two-thirds enrolled in a science course with a laboratory (physics or chemistry), and one-fourth enrolled in a general science or physical science course. One-half enrolled in a biology course. By the time they graduated, nearly all magnet students had completed a biology course (half had completed the magnet biology class) and a chemistry course.

The majority of magnet students in both classes reported receiving good grades in their four main subject areas (English, mathematics, science, and social studies). Approximately 80 percent reported receiving mostly Bs or better in their science, English, and social studies classes, and 59 percent reported receiving mostly Bs or better in their mathematics classes. These grades were generally consistent with students' school records, with students' mathematics grades lower than their other grades. On average, magnet students earned a 3.1 grade point average (GPA), and 61 percent earned at least a 3.0 GPA (that is, a B average). Magnet students' GPA in mathematics classes was 2.8, and only 44 percent earned at least a 3.0 GPA in math.

Most magnet students who attended college continued with their education in mathematics and science, and they reported doing well in these courses. Ninety percent attended at least one mathematics or science class during the first year of college. More than half took courses in both mathematics and science. Eighty-two percent of students taking mathematics reported that they received grades of B or better; 75 percent taking science courses received grades of B or better.

A majority of magnet students in these classes considered themselves just as prepared to learn the material as their classmates, and a substantial proportion felt better prepared. About 90 percent of students enrolled in mathematics classes and three-fourths of students enrolled in science classes felt as prepared as their classmates for the course work. More than half of those in mathematics classes believed that they were more prepared than their classmates.

The Magnet Program Attracted Students Interested in Health Professions and Fostered Their Interests

The magnet program succeeded in attracting students who were interested in careers in health professions. Three-fourths of magnet students stated that they enrolled in the magnet program because of their desire to enter a health profession and because of their belief that magnet program participation would be good preparation for doing so. About half the magnet students were interested in the program's courses, and 40 percent believed that their participation would help them get into college. About one-fourth of students also reported enrolling because of recommendations from their parents, friends, and teachers.

Consistent with their plans as they left high school, magnet students were more inclined to declare health-related majors than non-health-related majors. In their first year out of high school, 52 percent of college students declared a health-related major, and 45 percent declared a non-health major; the remaining students were undecided. Class of 1994 students were more likely than class of 1993 students to major in a health-related field (56 percent versus 46 percent), perhaps reflecting their more positive experience in the program and their increased exposure to health careers through the magnet program health courses. Students in four-year schools also were more likely to major in a health-related field than were those in two-year schools (60 percent versus 42 percent).

The most popular major was biological sciences. In their first year of college, 29 percent of magnet students declared this major. The second most popular major was business and communications; 15 percent of all students reported majoring in this field.

Underrepresented Minority Magnet Students Achieved Positive Secondary and Postsecondary Outcomes

Magnet program staff hoped to reach underrepresented minority enrollment of 55 percent for the magnet program. The percentage of students participating in the magnet program that constituted

underrepresented minorities grew over the first four years of the program from 29 percent to 40 percent of total enrollment, but still fell short of the target enrollment for underrepresented minorities. Most of the remaining magnet participants were Asian American and white students.

Although they did well academically in high school, underrepresented minority magnet students, especially Hispanic students, did less well than other students. Hispanic magnet students were less likely than other magnet students to be proficient in English, and this appears to have limited their achievement in high school. They were less likely to have completed advanced mathematics and science classes that would have strengthened their preparation for pursuing college majors leading to health professions, and they earned lower grade point averages overall.

Consistent with their plans when they were seniors in high school, Hispanic and African American magnet students continued their education beyond high school at high rates. All African American and 82 percent of Hispanic students in the two magnet classes enrolled in college within the first year after high school graduation (Table 6). The college enrollment rates of magnet students from different ethnic groups were substantially higher than those of their national counterparts, and about the same as their fellow magnet students. African American and Hispanic magnet program students also enrolled in two- and four-year institutions at higher rates than did students in these groups nationally.

These students persisted in their college education during the follow-up period. Of the minority students who attended college in the first year after high school, 90 percent attended continuously through the second year.

College academic experiences differed slightly for underrepresented minority students than for other students. Hispanic and African American students were less likely to select a health-related major than were other students (49 percent versus 58 percent), although biological science remained

TABLE 6

COLLEGE ENROLLMENT, BY STUDENTS' ETHNICITY
(Percentages)

	Hispanic	African American	White	Asian	Other	Total
Enrolled in College in Year 1	82	100	83	92	100	89
Enrolled and Stayed Through Year 1	82	100	67	88	100	85
Enrolled in Four-Year College	53	60	28	56	33	51
Enrolled in Two-Year College	29	50	56	35	67	39
Sample Size	**38**	**6**	**18**	**86**	**6**	**154**

SOURCE: 1994 and 1995 Andrew Hill Magnet Program Postsecondary Surveys, Mathematica Policy Research, Inc.

the most popular major for all groups of students. Hispanic and African American students enrolled in mathematics classes at the same rate as did other students but were less likely to take science classes. These students felt more prepared for their classes: 67 percent of underrepresented minority students versus 48 percent of other students felt more prepared than their classmates for their mathematics courses, and 50 percent of underrepresented minority students versus 32 percent of other students felt more prepared than their classmates for their science courses.

OTHER HIGH SCHOOL PROGRAMS ENCOURAGING MINORITIES IN THE HEALTH PROFESSIONS

The Andrew Hill Medical-Health Professions Magnet program is one of many existing high school programs designed to increase students' interest in and ability to succeed in careers in health professions. This section explores similarities and differences between the Andrew Hill magnet program and other programs and compares their results.

Project ACHIEVE

Project ACHIEVE, funded through the KFF's MMHP, was a collaborative venture involving four Memphis city organizations--the University of Tennessee, Memphis (UTM), Memphis City Schools (MCS), LeMoyne-Owen College (LOC), and Free the Children (FTC).[3] Each of the collaborators provided a set of services to participating students attending Northside High School in Memphis and its feeder junior high schools. As the coordinating institution, FTC served as the foundation's grantee and established formal relationships with the participating institutions to define their role in the project and provide funds for carrying out their responsibilities. MCS was responsible for a wide range of student support--including counseling, mentoring, and field trips to

[3]For more on Project ACHIEVE, see Dunstan et al. (1995), Kisker (1995b), Kisker and Dunstan (1995), and Kisker (1996).

colleges--and for some staff and curriculum development activities. UTM's key responsibility was to operate the Summer Institute, which provided on-campus hands-on experiences in the health sciences. LOC's responsibilities included staff development and on-campus junior high school programming.

Project ACHIEVE and the Andrew Hill magnet program differed in two key respects. First, Project ACHIEVE offered mostly supplemental and enrichment activities for participating students; the project did not group students together in academic classes. This was one of the primary interventions of the Andrew Hill magnet program; participating students took special magnet health and science courses together as a group. Second, Project ACHIEVE was a formal collaboration among interested organizations in the Memphis area. The four organizations shared responsibility for the success of the program. The KFF tried to establish a more formal collaboration in the San Jose community for the Andrew Hill magnet program, but responsibility for the program remained with program staff at Andrew Hill High School.

The two programs were similar in one key respect: neither program required students to meet academic requirements in order to participate in the program. Students' interest in participating was the primary prerequisite for entry into both programs. Thus, these programs differ from other high school programs that require students to meet some minimum academic requirements to participate.

Generally, Project ACHIEVE students had positive high school experiences as indicated by the following outcomes:

- Substantial proportions of Project ACHIEVE participants progressed to advanced mathematics and science courses by their senior year in high school. Approximately three-fourths of senior participants enrolled in an advanced mathematics course, and about one-half enrolled in a science course with a laboratory.

- Project ACHIEVE participants attended school more regularly than their classmates. Project seniors in most graduating classes were about half as likely as other seniors to

report cutting classes often. They were also less likely to have missed more than two days of school during the month preceding the follow-up survey.

- Project ACHIEVE students in most graduating classes reported earning better grades in mathematics and science than their peers. Approximately one-third earned good grades (that is, mostly Bs or better) in mathematics and science courses during high school.

These positive high school outcomes mirror high school outcomes of students enrolled in the Andrew Hill magnet program.

Postsecondary outcomes differed for students in the two programs. Like Andrew Hill magnet students, virtually all Project ACHIEVE seniors planned to pursue some postsecondary education. However, many Project ACHIEVE students did not follow through with their plans within the first year after high school, whereas a majority of Andrew Hill students entered a two- or four-year college by the fall following their high school graduation. By the fall of 1994, about three-fourths of students from the 1991 and 1992 classes had attended college--college attendance rates that Andrew Hill magnet students exceeded within the first year of high school graduation.

Both programs accepted *all* interested students, so the difference in students' postsecondary experiences cannot be attributed to the "creaming" of participants by the Andrew Hill program. A possible explanation could be in the program design. Since Project ACHIEVE planned to but never succeeded in grouping students together in key academic classes, program staff may have lost an opportunity to further reinforce students' commitment to academic achievement and promote cooperative learning styles. Andrew Hill magnet students' common experiences in special magnet classes with curricula tailored to health issues may have provided them with the increased motivation and support to pursue their postsecondary education immediately after high school.

Other Magnet Programs

The Andrew Hill Medical-Health Professions Magnet program is one of many health professions magnet programs throughout the country. Whereas the goals of these programs are similar--to increase minority participation in health professions and to promote desegregation and equality in public schools--they differ in two key respects:

1. ***Selectiveness.*** Many magnet programs select students based on academic performance or other selection criteria. As mentioned above, the Andrew Hill magnet program did not have such eligibility criteria.

2. ***Intensity.*** Andrew Hill's magnet program was a special program for a subset of students attending Andrew Hill High School; all students at the high school were not participants in the magnet program. In addition, magnet students were grouped together for only a few classes during the school day; the remainder of the school day students took classes with students not participating in the program. Other magnet programs are whole-school programs, involving all enrolled students at the school, or school-within-school programs, where participating students are grouped together for the entire school day.

These differences in program design could result in different outcomes across the different programs. Programs that allow only high-achieving students to participate are more likely to have positive outcomes. Students in these programs are likely to do well in high school and to proceed to postsecondary institutions, regardless of their participation in the magnet program. Programs that do not limit participation to students meeting academic standards are likely to enroll students with varying academic abilities and experiences and varying levels of motivation for continuing their education beyond high school. Schoolwide or school-within-a-school magnet programs are more intensive than a special magnet program like the Andrew Hill Magnet program, since the magnet school's theme is reinforced by teachers and staff throughout the students' school day.

The Andrew Hill magnet program achieved outcomes similar to other health professions magnet programs that have been studied, including the High School for the Health Professions (HSHP)

program, the Josiah Macy, Jr., Foundation's Ventures in Education program, and the Hopkins-Dunbar Health Profession program. Generally, students participating in these magnet programs attended college at high rates, and many declared health-related majors.

Most graduates of two high school programs sponsored by Baylor College of Medicine attended college and pursued health-related careers. The HSHP program is a selective high school health professions magnet program in Houston, Texas. Program students are selected on the basis of academic performance, test scores, conduct, and personal interviews. More than 85 percent of graduates annually attend college. A survey of graduates from 1975 through 1986 found that 92 percent had enrolled in college and 75 percent of those had majored in a science or health-related discipline. In 1990, 90 percent of seniors took the Scholastic Aptitude Test (SAT), and 95 percent had enrolled in college and received an average of $21,000 in financial aid. Approximately 35 percent cited medicine as their first career choice, and 78 percent were planning to pursue a science or health-related career. A similar program was implemented in Rio Grande Valley. In the first three graduating classes there, 80 percent enrolled in college, with most pursuing careers in the health professions (Ready and Nickens 1994).

The Josiah Macy, Jr., Foundation's Ventures in Education program has sponsored several magnet health-science high school programs around the country, whose participants have generally enrolled in four-year colleges. Each participating school agrees to extend the school day by at least one period, to keep program students together throughout high school, and to prepare students for college admission. Of the 1,036 participating students who graduated from the program high schools in 1991, 95 percent enrolled in four-year colleges, and of those in college for more than a year, 45 percent were majoring in health sciences (Lewin and Rice 1994). More generally, Ventures in

Education staff members report that 91 percent of graduates they surveyed attended college, and 31 percent majored in biology or health-medical fields (Harris, Cromer, and White 1992).

One of the Ventures in Education programs sponsored by the Josiah Macy, Jr., Foundation, the Macy program at DeWitt Clinton High School in the Bronx, New York, is a school-within-a-school program. Students are selected from among a large number of applicants and typically are "third-quartile" students. About 20 percent of the participants drop out of the program between grades 9 and 12. Among the 50 class of 1990 graduates, 94 percent enrolled in college, and 12 percent were attending competitive colleges. Twenty percent majored in biology, 12 percent majored in health and medical sciences, and, altogether, 40 percent majored in mathematics or science-related fields (Ready and Nickens 1994).

Finally, the Hopkins/Dunbar magnet preprofessional health sciences high school program, operated in collaboration with John Hopkins University at Dunbar High School in Baltimore, Maryland, has also reported positive postsecondary outcomes. The entire high school focuses on health careers, but the preprofessional program (also known as the "A-course") prepares students to be health professionals. Admission requirements for the A-course include a combined grade point average of at least 85, comparable grades in science and math, and at least 90 percent attendance in junior high. In the 1991 class, 30 out of 40 students who began the program completed it, and all who completed the program were admitted to four-year colleges (Ready and Nickens 1994). Three-fourths of the students actually attended college the following fall. Most of those enrolled said that they were enrolled in major fields closely tied to eventual careers in science or health professions. Progression rates, graduation rates, and college enrollment rates exceeded the average for a matched sample of high-ability students from other Baltimore city schools and from a sample of high-ability black students nationally (McPartland and Hall 1992).

Other High School Programs

Various secondary schools, colleges, and other organizations have implemented other high school programs to increase students' interest in health professions and motivate them to pursue heath-related careers in their postsecondary education. These other programs, like Project ACHIEVE, supplement or enhance students' regular school education typically through after-school and/or summer activities. As a result, they deliver less intensive services than the magnet school programs that reinforce a common theme during the students' school day.

These enrichment programs have also demonstrated positive outcomes. Three programs in particular--the Chicago Area Health and Medical Careers Program (CHAMPS), the Gateway to Higher Education program, and the Xavier University Preprofessional Health Sciences Programs--have been touted for the rate at which their minority students attend college and plan to pursue careers in health professions.

Most high school students who participated in CHAMPS, a series of after-school and summer enrichment programs sponsored for precollege students in the Chicago area, attended and completed college. Initially, students are recruited for the CHAMPS program with the help of principals, teachers, and counselors at some of Chicago's strongest public and private schools. The programs for high school juniors and seniors are limited to students who demonstrate academic performance, motivation, and the aptitude for a career in medicine. Although few evaluation results are available, staff members claim that 98 percent of participants who enter the program in high school or before earn a bachelor's degree within five years of entering college. Approximately one-half of those who participated in the program from 1980 through 1985 went on to either medical school or a health professions school (Lewin and Rice 1994).

The Gateway to Higher Education program, begun in 1986, is an intensive high school program sponsored by the Sophie Davis School of Biomedical Education in five public high schools in New York City. To be admitted, students had to be performing at grade level in reading and math, have an academic average of at least 80 in junior high school, and be motivated, as judged by consistency of academic performance and attendance. Nearly all 119 initial graduates enrolled in college. Most received financial support. Three-fourths enrolled in private colleges or out-of-state universities (Randy and Nickens 1994).

Xavier University, an historically black, Catholic college in New Orleans that graduates many of the country's minority medical students, sponsors the Preprofessional Health Sciences Programs. The university provides mostly New Orleans minority high school students with four summer enrichment programs. All four programs--MathStar for entering 9th graders, BioStar for 10th graders, ChemStar for 11th graders, and Stress on Analytic Reasoning (SOAR) for 12th graders--stress basic language and analytical skills. Entry requirements for SOAR include a minimum GPA of 2.75, grades C or above in mathematics and science courses, and a minimum ACT score of 20 (Ready and Nickens 1994). More than 70 percent of students participating in one of the summer programs apply for the next summer program (McBay 1994). According to program data, about 90 percent of SOAR participants thought that SOAR helped them get into college, and 70 percent of SOAR participants enrolled at Xavier (McBay 1994; Ready and Nickens 1994).

CONCLUSION

As program designers hoped, most Andrew Hill Medical-Health Professions magnet program seniors went on to college, and a substantial proportion pursued health-related majors. One year after their high school graduation, many students reported that the magnet program was successful at teaching them about health careers, encouraging them to pursue their education, and motivating

them to do well, indicating the program's role in students' continued education and interest in health careers.

Unlike other high school magnet programs, Andrew Hill achieved its positive postsecondary outcomes without restricting enrollment in the magnet program to high-achieving students. It is likely that most students who were interested in and applied for the magnet program were motivated students who self-selected into the program, but not all magnet students were strong academic performers. The magnet program nurtured the motivation of all students and helped them meet the requirements for entering either a two- or four-year college.

A review of Andrew Hill outcomes in the context of other high school programs' outcomes suggests that grouping program participants together in core classes and incorporating health topics into the curriculum for these classes may have been key to achieving positive outcomes. The success of such programs as the Gateway program and CHAMPS shows that comprehensive and high-quality supplemental or enrichment programs can produce positive outcomes for high-achieving students. However, as demonstrated by Project ACHIEVE, these programs "are not a substitute for strong curriculum in core academic subjects"; students, especially lower-achieving students, need a combination of supportive and academic preparation to excel and prepare for health-related careers (Ready and Nickens 1994).

For the success of the high school programs highlighted here to be sustained, undergraduate and graduate programs have to continue to support underrepresented minorities to increase the number who actually enter careers in health professions. High school programs, such as the Andrew Hill magnet program, can raise students' aspirations; provide them with the academic credentials to succeed in high school, college, and beyond; and give them the confidence that they can achieve in a field in which they have been historically underrepresented. Indeed, results from the study of the

Andrew Hill magnet program show that students have continued to persist and do well in college. However, postsecondary programs also have to continue to support and encourage students as they move along the "pipeline" towards health professional careers to ensure the long-term goals of these high school programs.

REFERENCES

American Psychological Association (APA). "Health Professions Education." Written testimony submitted to the Senate Committee on Labor and Human Resources. U.S. House of Representatives, Washington, DC, March 22, 1995.

Association of the American Medical Colleges (AAMC). "Nation's Leading Health and Education Associations Unite in Support of Affirmative Action." Washington, DC: AAMC Press Release, August 1, 1996.

Dunstan, Shari Miller, Ellen Eliason Kisker, and Michal Mazur. "Project ACHIEVE Implementation and Operation." Princeton, NJ: Mathematica Policy Research, Inc., 1995.

Harris, Joseph R., Janis Cromer, and Ronald White. *Expanding Horizons: Success in High School and Beyond.* New York: Ventures in Education, May 1992.

Kisker, Ellen Eliason. "Early Outcomes of the Andrew Hill High School Medical-Health Profession Magnet Program." Princeton, NJ: Mathematica Policy Research, Inc., February 1995a.

Kisker, Ellen Eliason. *Impacts of Project ACHIEVE on Student Outcomes.* Princeton, NJ: Mathematica Policy Research, Inc., 1995b.

Kisker, Ellen Eliason. *Project ACHIEVE: A Summative Evaluation.* Princeton, NJ: Mathematica Policy Research, Inc., 1996.

Kisker, Ellen Eliason, and Shari Miller Dunstan. "The Andrew Hill High School Medical-Health Professions Magnet Program: Implementation and Operations." Princeton, NJ: Mathematica Policy Research, Inc., October 1994.

Kisker, Ellen Eliason, and Shari Miller Dunstan. *Project ACHIEVE: The Educational Experiences and Plans of Northside Seniors: 1990-1994.* Princeton, NJ: Mathematica Policy Research, Inc., 1995.

Komaromy, Miriam, Kevin Grumbach, Michael Drake, Karen Vranizan, Nicole Lurie, Dennis Keane, and Andrew Bindman. "The Role of Black and Hispanic Physicians in Providing Health Care for Underserved Populations." *New England Journal of Medicine*, vol. 334, no. 20, May 16, 1996, pp. 1305-1310.

Lewin, Marion Ein, and Barbara Rice (eds.). *Balancing the Scales of Opportunity: Ensuring Racial and Ethnic Diversity in the Health Professions.* Washington, DC: National Academy Press, 1994.

McBay, Shirley M. "Lessons from Mathematics and Science Programs." In *More Minorities in Health,* edited by Barbara J. Kehrer and Hugh C. Burroughs. Menlo Park, CA: Henry J. Kaiser Family Foundation, 1994.

McPartland, James M., and Christine Hall. "The Hopkins/Dunbar Health Professions Program After Five Years: A Status and Evaluation Report." Paper presented at the Henry J. Kaiser Family Foundation Funders Forum, February 25-26, 1992.

National Center for Education Statistics (NCES). *The Condition of Education, 1996.* Washington, DC: U.S. Government Printing Office, 1996.

National Education Longitudinal Study (NELS). Tabulations from the Second Follow-Up Public Use Data Files, 1992.

Nickens, Herbert W., and Timothy P. Ready. "Problems in the Pipeline." In *More Minorities in Health*, edited by Barbara J. Kehrer and Hugh C. Burroughs. Menlo Park, CA: Henry J. Kaiser Family Foundation, 1994.

Nickens, Herbert W., Timothy P. Ready, and Robert G. Petersdorft. "Project 3000 by 2000--Racial and Ethnic Diversity in U.S. Medical Students." *New England Journal of Medicine,* vol. 331, no. 7, August 18, 1994, pp. 472-476.

Ready, Timothy, and Herbert W. Nickens. "Programs that Make a Difference." In *More Minorities in Health,* Edited by Barbara J. Kehrer and Hugh C. Burroughs. Menlo Park, CA: Henry J. Kaiser Family Foundation, 1994.

Rivo, Marc L., and David A. Kindig. "A Report Card on the Physician Workforce in the United States." *New England Journal of Medicine,* vol. 334, no. 14, April 4, 1996, pp. 892-896.

Rosenberg, Linda C., and Ellen Eliason Kisker. "Postsecondary Outcomes of the Andrew Hill High School Medical-Health Professions Magnet Program." Princeton, NJ: Mathematica Policy Research, Inc., April 1997.