

PREPARING AFRICAN AMERICANS FOR CAREERS IN HEALTH CARE: THE JACKSON HEART STUDY

The Jackson Heart Study Undergraduate Training Center (UTC) at Tougaloo College was developed to increase the numbers of African-American students entering public health and health related fields. The UTC includes a scholars program for undergraduate students at Tougaloo College, three four-week programs for high school students called the SLAM (science, language arts, and mathematics) workshops, and an introductory epidemiology course for healthcare professionals and graduate students. The scholars program recruits 12 Tougaloo College freshmen annually for the duration of their undergraduate education. As of the 2005 summer, 512 students have enrolled in the SLAM workshops. The introduction to epidemiology course has provided training for 155 individuals from 1999 to 2004. This paper documents the need for this program based on the conspicuously small proportion of African Americans who are health practitioners in Mississippi. The content and selection process for each program is described, and a summary of the enrollment history, characteristics of the program participants, and their accomplishments is presented. Finally, the methods of program assessment and tracking are discussed. (*Ethn Dis.* 2005;15[suppl 6]:S6-71-S6-75)

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INTRODUCTION

The original concept for the Jackson Heart Study (JHS) did not include explicit initiatives that would address the persistent dearth of African-American students who pursue graduate education in the health sciences in Mississippi. However, during the planning phases of the JHS we saw that an infusion of improved disease detection, treatment, and prevention in the African-American community would require a broader approach that would eventually result in African-American health professionals' doing the research, treating the patients, and conveying prevention strategies to the population at risk as described by Nickens et al.¹ This ambitious objective cannot be accomplished in a short period of time or with the resources typically available to a longitudinal research undertaking. Thus, an unprecedented and innovative component of the JHS was established to provide for undergraduate training opportunities and incentives in the public health sciences for students at Tougaloo College.

Tougaloo College is located in suburban Jackson, Mississippi, a few miles north of the Jackson Medical Mall, the headquarters of the JHS. This institution has a long and successful history of producing graduates who are well prepared for advanced education in health-related disciplines. Its undergraduate student body, which is predominantly African-American, has an enrollment of ≈ 1000 , and it graduates ≈ 150 students a year. In the late 1960s, the first African-American students to attend the University of Mississippi's Medical School were Tougaloo graduates.² In

recent years, increasing numbers of students have pursued graduate studies in medicine, dentistry, veterinary medicine, medical technology, and public health-related disciplines.

Authoritative statistics regarding the proportion of African Americans in Mississippi in the wide range of vocations that support public health, such as epidemiology, biostatistics, and preventive medicine, are difficult to obtain. However, these proportions might be mirrored by those for healthcare professionals such as physicians and registered nurses. The 2002 statistics published by the Mississippi State Department of Health show that 6.7% of Mississippi's active physicians were African-American.³ The proportion of African-American registered nurses with active licenses in 1999 appears to be similarly low 16%.⁴ These low percentages suggest that the other vocations that support public health are similarly underrepresented for a state in which African-American citizens constitute $>36\%$ of the population, one of the highest in the nation.⁵

The Undergraduate Training Center (UTC) at Tougaloo College has initiated programs that are designed to encourage careers in health care in general and public health in particular. At the high school level, the science, language arts, and mathematics (SLAM) program introduces public health science to students by using enriched curriculum during the summer. The Jackson Heart Study scholars program (JHSSP) is a 3.5-year undergraduate enhanced academic scholarship program that provides specific public health training and hands-on experience. Finally, the UTC provided an intensive

study in epidemiology to meet training needs and encourage healthcare providers and others in the healthcare community to better understand public health principles and methodology.

METHODS

Science, Language Arts, and Mathematics

At its inception in the summer of 1999, the program for high school students started with one life science course, which was repeated during the summer of 2000. During the fall of 2000 and spring of 2001, the UTC developed the SLAM workshops and implemented them during the summer of 2001. The SLAM workshops provide strong foundations in math, science, and communication skills as well as a detailed understanding of the Jackson Heart Study and health careers, particularly in the areas of public health and epidemiology. Three levels of the workshop are available to the students. Ninth grade students are offered SLAM I, while students in 10th and 11th grades are offered SLAM II and SLAM III, respectively. The content in the three workshops is coordinated; eg, math skills support the student's work in the science labs and the work in language arts makes connections to the student's work in the math workshop and science labs. The three subject areas in each of workshops I, II, and III are sequential and they build on skills learned the previous summer. Students are encouraged to participate in the program for all three summers. However, a student could participate as an 11th grader without having attended workshops as a 9th or 10th grader.

The curriculum in the SLAM workshops was developed by using the approach of Wiggins and McTighe, which involves identifying desired results, determining acceptable evidence of achievement of those results, and then planning learning experiences and

instruction.⁶ A team of college and high school teachers conducts these workshops. All the teachers in the SLAM program work collaboratively and meet once a week during the session to discuss the curriculum, refine lessons, and assess students' progress. Another major goal of the SLAM workshops, in addition to academic advancement in the sciences, is to encourage articulate verbal and written expression by the students. Presentations and written reports are required but few didactic examinations are administered.

The fliers describing the workshops as well as the requirements and procedure for applying are circulated to all high schools in the metropolitan Jackson area. Additionally, a JHSUTC program representative visits most of the high schools to verify appropriate distribution of the materials and to answer questions that the school faculty or administration might wish to have addressed. The SLAM workshops are also advertised on the Jackson public schools' website.

The selection of SLAM participants is based on: 1) academic performance; 2) an essay submitted by the applicant; and 3) recommendation letters from two high school teachers. A selection committee made up of representatives from each of the three JHS partner institutions rates the candidates on each criterion and top-rated candidates are selected to participate in SLAM workshops.

The SLAM program is evaluated by an experienced K-12 education specialist. She has developed a survey instrument that is administered to the students at the end of the workshop. She also conducts focus group interviews with the parents of the participants and their teachers. Her annual assessment reports have been instrumental in helping the program make changes necessary to sustain its high quality. In addition the teachers are required not only to evaluate the performance of each of the students in

their class but also to submit a report detailing their assessment of things that worked well and things that need changing and how they would modify classroom activities. All of these are used to improve the program during the next summer.

The UTC has established a program to track all of the students who go through the SLAM program to determine if the program is having an impact on the career choices of these students.

Jackson Heart Study Scholars Program

The JHSSP was developed to increase the number of African-American students who pursue careers in health-related fields in general and in public health science and epidemiology in particular. The first class of five JHS Scholars was selected during the fall semester of the 1999–2000 academic year from the incoming freshman class at Tougaloo College. Since the 2000–2001 academic year, the scholars have been selected near the end of the first semester of their freshman year. During 2000 and 2001, 10 students were selected each year as JHS scholars, and subsequently the number has been increased to 12 a year. The JHS Scholars are expected to remain in the JHSSP for the duration of their undergraduate career at Tougaloo College. The minimal requirements for consideration as a JHS scholar are a 3.0 grade point average (GPA), an ACT score ≥ 20 (or its SAT equivalent) and a personal statement of the student's professional goals. Students must also submit letters of recommendation from two of their current Tougaloo College professors (at least one letter should be from a math or science instructor) along with fall semester midterm grades.

The six- to eight- member selection committee is made up of representatives from all participating JHS institutions and reviews all applications and determines eligibility of each applicant based

Table 1. Enrollment in JHS sponsored courses

	1999	2000	2001	2002	2003	2004	2005
Introduction to Public Health and Epidemiology (Fall)	12 (12*)	8 (3*)	15 (3*)	15	11	13 (1*)	
Biostatistics (Spring)	19 (19*)	6 (6*)	9 (5*)	13 (8*)	16 (1*)	13 (4*)	16 (4*)
Ethics, Medicine and Technology (Spring)				15 (6*)	13 (10*)	16 (1*)	12 (5*)
Research Methods in Public Health and Epidemiology (Fall)			2	5	16	9	

* Indicates non-JHS students enrolled in the course.

upon the minimal requirements. The selection committee interviews the eligible applicants and recommends the top 12 candidates and four to six alternates to the director of the UTC. The UTC director makes the final appointments after the receipt of the final semester grades. The JHS scholars are required to take all of the JHS-sponsored courses (Introduction to Public Health and Epidemiology, Research Methods in Public Health and Epidemiology, Biostatistics and Ethics, Medicine and Technology), attend all required colloquia, and be cooperative and responsible participants in JHS activities.

In addition to the required courses listed in Table 1, the JHS Scholars participate in extensive didactic, applied, and clinical research. This training begins with a module entitled "Human Research Protection Issues" and includes three additional modules through the sophomore year. Topics in these modules include data entry, data quality control, health promotion, and medical records procedures. These topics are the basis for more detailed practicum assignments in the fall semester of the junior year. Finally, in the spring semester of the junior year the JHS scholars complete a research module that includes literature review and data analysis.

Freshman students are introduced to public health, epidemiology, cardiovascular disease, and health disparities topics through a weekly series of seminars. During the academic semesters of their sophomore and junior

years, JHS scholars are required to participate in a minimum of two-hour per week professional development activities at the JHS Coordinating Center or Examination Center. During the spring semester of their junior year and the entire senior year, all scholars are matched with professionals in their area of interest and are required to participate in ongoing research activities. Academically, they are expected to maintain an overall GPA of 3.0.

During the summer, all freshman scholars act as tutors and mentors in the SLAM program. Scholars entering the junior and senior year must participate in health-related research at liaison or other institutions during the summer months. Summer internships are the culmination of this research training as scholars are engaged at numerous research venues. Once notification of acceptance into a summer program is received, the summer mentor is contacted and information is provided about the JHSSP. Included in the information packet are student and mentor expectations, a mentor evaluation form, site placement information, and an abstract form. After a JHS scholar arrives at the summer destina-

tion, the UTC closely monitors the student's progress. They are not only required to submit an abstract of their summer research, but are also expected to make an oral presentation on campus and submit the abstract for presentation at a scientific meeting.

Table 2 summarizes the location of the internships since the inception of the program. Notice that during past two years of the program, most internships have occurred at national or international locations.

The UTC tracking program keeps track of the scholar's progress during the academic year and summer placements and, after they graduate, their career choices. The UTC intends to track the students for at least 10 years after they have graduated from Tougaloo College.

Introduction to Epidemiology for Health Professionals

The Introduction to Epidemiology for Health Professionals (IEHP), taught from 1999–2004, was intended to provide an intensive introduction to epidemiology for advanced undergraduate students, graduate students interested in careers in biomedical sciences or behavioral sciences, and health profes-

Table 2. JHS scholars summer internship location

Year	Local	Regional	National	International
2000	5			
2001			2	1
2002	4	2	6	3
2003	10	4	7	1
2004	3	2	13	1
2005	5	2	10	4

Table 3. Characteristics of SLAM participants

	Total Applications	Males	Females	Number of Participants	Males	Females	Number Returning
1999	75	22	53	37	15	22	
2000	75	30	45	36	12	24	
2001	190	56	134	58	16	42	26
2002	232	61	171	98	34	64	27
2003	117	31	86	90	13	77	36
2004	103	23	80	99	19	80	45
2005	86	19	67	94	22	72	46

sionals. The IEHP introduced students to some of the basic principles of epidemiology during an intensive, short (six-day) course of study. The course introduced the principles and methods of epidemiologic investigation of diseases and illustrated the different study designs used for evaluating risk factors and measuring the effectiveness of health interventions and services. In addition to lectures, laboratory problems provided experience in the application of epidemiologic methods and dealing with issues related to experimental and nonexperimental designs, sensitivity and specificity of diagnostic tests, confounding effects, and the use of survival analysis of longitudinal data.

The course had an enrollment limit of 30 professional and graduate students but occasionally included interested and qualified undergraduate students. Housing and meals were provided at no cost to the participant, and they could receive academic credit from the local JHS partner academic institutions—Tougaloo College, Jackson State University, and the University of Mississippi Medical Center. Participants who received academic credits were assessed a tuition fee by the institution from which they sought the credit, but no cost was incurred by students who did not seek academic credit. The course was taught by a team of three instructors under the leadership of an author of this report, Moyses Szklo, MD, DrPH, professor of epidemiology at the Johns Hopkins University School of Hygiene and Public Health.

All participants filled out an evaluation questionnaire at the end of the six-

day course. The UTC also tracks the participants on their current professional placement and intends to keep track of them until 2012.

RESULTS

Details regarding the SLAM program participants are shown in Table 3. Since the inception of the program in 1999, the rate of return to subsequent summer sessions has been consistently high. We have usually had two to three applications for every slot. Because of this intense competition we invite back only students who display serious academic interest.

The JHS scholars program has consistently encountered significant numbers of qualified women who apply and are accepted into the program, as shown in Table 4. The Tougaloo student body is >70% female. Also, almost all Tougaloo students come from Mississippi, hence the low number of non-Mississippi students among the scholars. While the program is open to all freshmen students irrespective of their major, most of the scholars (31

out of the 45) tend to be biology or chemistry majors.

As of May 2005 we have graduated 24 students. Six of them are in medical/dental school, 11 are in graduate/professional school, and 7 are working in health-related jobs and indicate that they plan to go to graduate school in the near future.

Table 5 shows a profile of the IEHP students since 1999. While the number of students has been maintained at the target level of 25–30 over time, the composition of the class has increasingly trended toward professionals as students seeking degrees (graduate and undergraduate) have become less common. The number of applicants has remained steady over the years. During the past few years we have experienced an increase in the number of participants from outside Mississippi. The program has been extremely well received.

DISCUSSION

The UTC at Tougaloo College as a component of the JHS is clearly a unique and innovative undertaking

Table 4. Characteristics of Jackson Heart Study scholars

	Total Scholars	Number of Males	From Mississippi		Biology/Chemistry Majors
			MSA	Non MSA	
1999/2000	5	0	1	4	2
2000/2001	15	4	6	9	11
2001/2002	24	6	14	10	15
2002/2003	34	7	17	16	24
2003/2004	43	9	20	21	32
2004/2005	45	12	23	22	31

Table 5. Introduction to Epidemiology for Health Professionals

	1999	2000	2001	2002	2003	2004
Number of graduate students	9	3	6	3	1	5
Number of undergraduates	4	15	10	7	9	0
Number of professional	8	5	12	14	18	17
Others	3	6	0	0	0	0
Total	24	29	28	24	28	22
Number requesting credit	12	3	3	4	3	5

that addresses one dimension of the vexing cardiovascular disease epidemic in African Americans. The shortage of African-American medical care providers, public health practitioners, and medical researchers all contribute to the disparities in African-American cardiovascular health. The long-term approach to resolution of disparities in health that is implied by approaches described in this report is clearly unprecedented and overdue.⁷

While all three programs of the UTC provide new approaches, the JHSSP is the core program from the perspective of resource allocation and hope for relatively near-term impact. Beyond the details of the academic content for JHSSP outlined above are numerous additional attempts to expose these undergraduates to the medical and public health research infrastructure. These attempts include JHSUTC staff-led annual visits to the National Institutes of Health and the Centers for Disease Control and Prevention. These visits provided opportunities for the JHS scholars to meet leaders of these agencies, understand their magnitude and the opportunities that they provide, as well as share their initial research interests and experiences.

The high-level interest, and uniform participation in the summer internship research program of the JHS Scholars is perhaps the most tangible and satisfying accomplishment of the UTC. Numerous published abstracts have resulted from this work, including three publications, and the acceptance and adoption of the JHS scholar interns by wide array of notable research programs continues. The success of the internships also indicates that the JHS scholars are adequately prepared for these research experiences by the academic program and training modules in the sophomore and junior years detailed in this paper. Tracking of the JHS scholars will eventually provide more definitive evidence that the program has accomplished its purpose to facilitate and stimulate Tougaloo College students into careers in public health or medical research.

Another surprising consequence of the UTC initiative has been the breadth and intensity of interest in the SLAM program in the Jackson metropolitan area. After the first year of the program, the competitive zeal of students, parents, and high school faculty for acceptance to the program has grown beyond expectations. The resources expended for the

four-week summer SLAM program are worth while, considering the potential for enhancing academic achievement in the sciences. Many of the graduates of this program are now JHS scholars and are well on their way to a productive career in the health field.

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