

Strategies for Pipeline Programs

K-8 Models

K-4th graders traditionally have been overlooked as a source for nurturing future healthcare professionals. However, studies have shown that by grade 4, some children have already made career choices. Kids often decide at a young age they don't like math or science, which are the basics for most health careers. We need to reach kids early, before their minds are set. The rapid growth in our country's aging population, coupled with a declining interest in traditional healthcare careers, is setting us up for a future healthcare crisis. Engaging children from a young age is one possible solution to avoid a critical shortage of trained healthcare professionals down the road.

Baylor College of Medicine K-12 Education Program:

The Graduate Teaching Fellows in K-12 Education (GK-12) program at Baylor College of Medicine (BCM) is a unique partnership conducted by the Center for Educational Outreach and Graduate School of Biomedical Sciences in collaboration with the Houston Independent School District (HISD). Funded since 2001 by the National Science Foundation, GK-12 partners BCM graduate student scientists with HISD secondary life sciences teachers.

BCM graduate student scientists and their teacher partners work together to develop new life sciences teaching resources. At the same time, graduate students have opportunities to improve their abilities to communicate science information to diverse audiences. Up to five GK-12 Fellows and GK-12 Teacher Partners are selected to participate each year.

Five HISD high school life science teachers will be selected through an application process to partner with a BCM graduate student scientist for one year of activity planning and classroom instruction.

Each GK-12 teacher/scientist team will collaborate on an innovative, inquiry-based classroom/lab project. Each teacher will have an opportunity to learn cutting-edge life sciences concepts through interaction with his or her partner scientist. Each GK-12 teacher partner will receive a \$1,200 stipend. School classroom will receive a laptop computer or projector. Excellent addition to the teacher's annual evaluation.

Valle Imperial Project in Science

The Valle Imperial Project in Science (VIPS) is a NSF funded Local Systemic Initiative serving approximately 22,500 K-6 students and 1100 teachers in 14 school districts in Imperial County, California. Imperial County is in the southeast corner of California along the United States border with Mexico. Imperial Valley is both one of the largest (4597 sq. mi.) and most sparsely populated (130,000) counties in California. Geographic isolation is especially acute in the San Pasqual Unified School District located on the Quechan Indian Reservation, as residents from this district travel over 60 miles just to get to El Centro, the county seat.

Many Imperial Valley residents live in extreme poverty, with household incomes declining in real dollars over the last decade. The IRS reported a 1997 mean per capita income of \$16,322, the lowest of all California counties. Of the 22,500 K-6 students in the

Imperial Valley, 81% are Hispanic, 5% African-American, 11% Caucasian, 1% Asian and 1% Native American. More than 50% of the students in the county are Limited English Proficient.

The Valle Imperial Project in Science began in the summer of 1998 as a collaborative partnership between the fourteen Imperial County school districts and San Diego State University, Imperial Valley Campus. It was preceded by three years by a pilot effort on the part of the El Centro Elementary School District, which with 6500 students is the largest district in the county. The pilot program established three pilot schools, a fully functioning materials resource center and developed a cadre of lead teachers. This pilot school effort was the result of the El Centro Elementary School District participating as a member of the National Science Foundation funded Pasadena Center Program at the California Institute of Technology. Direct technical assistance and support was provided by the Pasadena Center to build capacity within the district for future district-wide and countywide expansion of the program.

The instructional program which evolved out of this pilot school effort was based upon five critical elements associated with other successful programs of this genre:

- sustained professional development and support for teachers and school Administrators
- high quality curriculum
- materials support
- community and top level administrative support
- Assessment

The program utilizes a mosaic of second generation, high quality, research based instructional materials in the form of kits or modules drawn from sources such as Science and Technology for Children (STC) developed by the National Science Resources Center (NSRC) at the Smithsonian Institution supported by the National Academy of Sciences, Full Option Science System (FOSS) developed at the Lawrence Hall of Science, University of California, Berkeley and Insights created by the Education Development Center in Newton, Massachusetts.

Students are exposed to four modules per year except at the kindergarten level where students are exposed to three modules per year. **The modules provide a balance of topics each year drawn from life, physical and earth science domains. Using these units or modules, students are provided with rich opportunities to become directly engaged in science process skill development.** Science content is covered in greater depth compared to a superficial traditional textbook approach. Each topic then becomes a vehicle for the construction of important scientific concepts that are both developmentally appropriate and able to capture the natural curiosity of the students. All modules are aligned to the National Science Education Standards.

The teachers are provided with at least 100 hours of professional development designed to deepen their own content understanding and to address pedagogical issues. A major focus of the initial training centers on the developmental storyline of the unit. Teachers are engaged in the content of the module in the same manner as their students. The purpose of the developmental storyline is for teachers to experience and understand that the activities of the unit are connected and lead to big ideas in science. Teachers receive in-classroom professional support from a cadre of resource teachers and ultimately

have an opportunity to meet in grade level groups to deconstruct or reflect on their teaching practices. Examination of student work is a major component of the reflective teaching practices portion of these sessions. Advanced topics in content, literacy, language acquisition, and module specific multiple measure assessment strategies are also provided.

Program Success:

Table 1 presents the cumulative and disaggregated data for students who had been continuously enrolled in the El Centro Elementary School District for four consecutive years.

**Achievement Test, 9th Edition, Form T
Science Section
Spring 1999 Results in National Percentile Rankings
Disaggregated by Student Participation during the 1998-99 School Year**

	Gr 4	Gr 6
Cumulative NPR:	31(n=630)	40(n=638)
Students Participating in 1999	40(n=393)	59(n=358)
Students Not Participating in 1999	21(n=237)	33(n=280)

There is also data that indicates that the longer students participated in the program, the higher their test averages rose as well as findings about the improvement of writing skills among students.

The University of Connecticut:

Aetna Health Professions Partnership Initiative Great Explorations

The Great Explorations program is an after-school program designed to provide extra curriculum activities in math, science and reading to current 6th, 7th and 8th grade middle school students. Students participating in the Great Exploration program are currently enrolled in one of three Hartford Public Middle Schools, Bellizzi, Kennelly and Naylor. The program provides in-school health professions an educational program for 6th grade students and after-school science, reading, math and preparation activities for 7th and 8th grade students. Great Exploration offers a four-week summer academic enrichment program for approximately 30 rising 7th and 8th grade participants. The program is held at the Greater Hartford Academy of Math and Science. Students receive instruction in math, science, and language arts. The Great Exploration Program targets any racially ethnic group i.e. African American, Hispanic, Latino, Native American, Native Hawaiian, and/or others, from institutionally underserved backgrounds meeting eligibility criteria.

Funding:

The program is funded through endowment gifts that the university received, totaling \$3.5 million, including \$2 million from the Aetna Foundation to support the UConn Health Center’s Health Professions Partnership Initiative (HPPI) and \$1.5 million from Aetna Chairman and CEO Dr. John W. Rowe, and his wife, Valerie. The gifts are expected to be eligible for a match from the state of one dollar for every two dollars donated, under a program established by the state legislature. This would increase the value of the combined gifts to \$5.25 million. The Aetna Foundation’s endowment will provide long-

term stability to the HPPI program, which will be renamed The Aetna Health Professions Partnership Initiative at the Health Center. The endowment from the Rowe Family Foundation will enrich the academic experience for underrepresented undergraduate students interested in the health professions.

Virginia Commonwealth University Programs:

VCU Summer Discovery

This summer program for middle school students offers two health care focused classes (listed below) in which students spend a week at the VCU Medical Center with either School of Nursing faculty and students, or with a Medical student and professionals in various health care fields.

- **A Week in Scrubs-Nursing in the 21st Century** includes visits to operating and emergency rooms, a look at pediatric nursing with a visit to the neonatal intensive care unit and an introduction to the latest equipment and skills being used by members of the nursing profession. This course is presented by the VCU School of Nursing and the VCU Medical Center.
- **Exploring Health Care** provides students the opportunity to spend a week with a medical student at the VCU Medical Center and meet health care professionals in different fields, including but not limited to pharmacy, surgery, physical therapy and emergency medicine. By visiting different laboratories and having hands-on experiences and interactions with health professionals, students learn about the challenges and rewards of various careers in health care.

Jump Rope to Stethoscope

Jump Rope to Stethoscope is a community outreach program offered through the Office of Workforce Development at the VCU Medical Center. This program is designed to reach children in grades kindergarten through 12 to increase the education and awareness of health care professions. Students are introduced to the health care field through many diverse programs including nursing camps, attending school career days, hospital tours, health care clubs and courses offered at Martin Luther King Middle School. In addition, this program partners with the Forensic Nurse Examiners Team, which conducts outreach programs on trauma prevention and safety at high schools in Central Virginia. This pipeline program has the goal of increasing the diversity within the health care workforce and to create the VCU Medical Center workforce of the future

High School Models

Baylor College of Medicine High School Programs:

Magnet High Schools:

The Michael E. DeBakey High School for Health Professions

DeBakey High School's mission is to provide a challenging, well-balanced college preparatory program which focuses on educational experiences in science and the health professions and furthers an understanding and appreciation of our multicultural community.

The Michael E. DeBakey High School for Health Professions is located in the Texas Medical Center in Houston, Texas. Fostered by and eventually named after the renowned heart surgeon, the school's award winning approach to education has been duplicated around the world.

Ranked as the number one public high school in the Houston Independent School District, the school attracts the best students and faculty from around the region. Designed in partnership with the Baylor College of Medicine as a rigorous four-year health professions magnet program, the school prepares a diverse student body to go on to the best colleges and universities. A five year mathematics sequence and competitive Advanced Placement program develops students with an essential academic foundation before going on to advanced degrees. The unique, four year health sciences program gives students practical experience with health professionals in the Texas Medical Center and in the classroom. Our 100-hour community service program gives our students rare understanding of the responsibility required in serving others. With over 900 students and a teaching faculty of 52, the school demands a written commitment from both students and parents to abide by a school honor code, community service program, and our 35 year tradition of excellence.

Premedical Honors College

The PHC is an eight-year, high school-through-medical school pathway created by Baylor College of Medicine and The University of Texas-Pan American, to increase the number of physicians in medically underserved areas of Texas.

PHC students attend UTPA for their undergraduate education and receive conditional acceptance to BCM upon acceptance into the program. Scholarship assistance is available (undergraduate and medical school). Those who fulfill all PHC requirements and BCM prerequisites are accepted into BCM upon graduation from UTPA.

The PHC has become significant nationally as a producer of Mexican-American medical students. It was awarded the Texas Higher Education Coordinating Board STAR Award in 2002 for its pivotal role in expanding educational pathways for Texas students.

High School for Health Professions, South Texas (Mercedes)

Since 1983, BCM has worked with the South Texas Independent School District to plan and implement a high school program modeled after the DHSHP in Houston. The South Texas High School for Health Professions (known as MedHigh), located in a modern facility in the Rio Grande Valley, enrolls 664 students, of whom approximately 80% are Hispanic. The

school has 1,859 graduates. More than 90% have accessed college education, and most report interest in medicine, science and/or the health professions. MedHigh is one of the top-scoring schools in its District and the State on the Texas Assessment of Academic Skills. In 1997 and 1998, it was selected by the U.S. Department of Education to receive the Secretary's Award for Outstanding Vocational-Technical Education and was recognized by the Texas Education Agency as an Exemplary High School for the past five years. Each year, up to 25 of the school's rising seniors are selected for summer programs at BCM. To date, 37 MedHigh graduates have entered the BCM-UTPA BS/MD program. For more information, visit the MedHigh web site.

Science Academy of South Texas (Mercedes)

Building upon its successful partnership with the South Texas Independent School District, BCM has assisted in establishing the Science Academy of South Texas. Opened in 1989, the Science Academy is designed to increase science and mathematics preparation of students in the Rio Grande Valley. It is one of the top-scoring schools in the State on the Texas Assessment of Academic Skills. A new facility was opened in 1992 to provide learning experiences for up to 600 students in grades 9 through 12. The partnership was strengthened by the addition of Rice University in 1991. The school currently enrolls 635 students, of whom 60% are Hispanic. A total of 856 students have graduated from the Science Academy and three are in the BCM-UTPA BS/MD program. Each year since 1993, the Science Academy has been recognized by the Texas Education Agency as an Exemplary High School. In addition, the school was identified in 2003 by Newsweek magazine as one of the top 10 high schools in the United States. For more information, visit the Science Academy of South Texas web site.

Moody High School Science and Health Center (Corpus Christi)

In 1990, BCM began a partnership with the Corpus Christi Independent School District to assist in developing the Foy H. Moody High School Science and Health Center, a program designed to provide opportunities similar to those offered by the Houston and South Texas Magnet programs. The current enrollment of the Science and Health Center is 317 students, of whom approximately 92% are Hispanic and six percent are African-American. Students are selected based on grades, attendance, and commitment to health careers. BCM provides summer enrichment activities for these students at the College. BCM faculty provide instruction and clinical experiences, support curricular development and make presentations on the campus. The curriculum was revised in 2000 to focus on a college preparatory orientation. To date, the program has 437 graduates and two graduates have entered the BCM-UTPA BS/MD program. For more information, visit the Moody High School Science and Health Center web site.

Business, Education, and Technology Academy of South Texas (Edinburg)

Opened originally in 1993 to address the shortage of Hispanic school teachers (especially in science and mathematics) and to increase professional development opportunities for teachers in South Texas, the Teacher Academy was the nation's first pre-college school designed specifically for students who wish to pursue careers in teaching. The mission of the school was expanded in 2003 to include business and technology. Located in the South

Texas Independent School District in Edinburg, Texas, the school's current enrollment is 806 students, grades seven through twelve, of whom approximately 80% are Hispanic. The program graduated its first class in 1998 and 282 students have graduated since then, and one student is in the BCM-UTPA BS/MD program. For more information, visit the Business, Education, and Technology Academy web site.

John B. Alexander Magnet for Health and Science (Laredo)

This program, established in 1994, is a partnership between BCM and the United Independent School District in Laredo, Texas. This "school within a school" is a four-year college preparatory program for students interested in careers in medicine, science and the health professions. Program students (currently 479) engage in mathematics- and science-based curriculum, and participate in summer activities to help prepare them for and gain exposure to career options in health-related professions. Approximately 90% of the program's students are Hispanic. Alexander Magnet for Health and Science students and teachers participate in BCM's DocPrep program each summer.. The program has 408 graduates to date and 15 students have entered the BCM-UTPA BS/MD program. For more information, visit the Alexander Magnet for Health and Science web site.

South Texas Academy of Medical Technology (San Benito)

Opened in 2003, the South Texas Academy of Medical Technology, or MedTech, is the newest addition to the Rio Grande Valley's first and most established magnet school district, the South Texas Independent School District. Eighty-three ninth-grade students are enrolled in a college preparatory program that combines solid academics with real world experiences in local healthcare settings. Over the next three years, an additional grade level will be added until the school reaches a full enrollment of 600-700 students. For more information, visit the MedTech web site

DocPrep

Each summer, 50 outstanding juniors and seniors from South Texas high schools are selected, along with eight teacher mentors, to participate in DocPrep, a week-long academic enrichment program at Baylor College of Medicine and Rice University. DocPrep provides health professions-related activities at the Texas Medical Center, including medical lectures, college/medical school counseling, a communications course at Rice University, and hands-on laboratory experiences in which students work with brains, cadavers and hearts.

DocPrep participants tour at least one hospital in the Texas Medical Center and observe surgery from a viewing dome. Program participants have the opportunity to interact with BCM medical students, faculty and staff. BCM medical students serve as DocPrep counselors and accompany students and teachers to all activities

The University of Connecticut Health Center's Health Professions Partnership Initiative (HPPI)

Health The University of Connecticut Health Center's Health Professions Partnership Initiative (HPPI) is collaboration between the Hartford Public Schools, the Health Center's

Department of Health Career Opportunity Programs, a community service agency, and three partner colleges: University of Connecticut, Wesleyan University, and Central Connecticut State University. Although the Department of Health Career Opportunity Programs existed before 1996, the HPPI collaborative was officially funded in 1996. The HPPI annually provides academic support services and opportunities to more than 270 students from traditionally underrepresented, low-income, and first-generation college backgrounds. In total in its tenure, the HPPI has enrolled more than 3,000 students in grade six through college.

The HPPI was created as a response to two basic concerns: (1) Connecticut institutions of higher education were graduating very few underrepresented minorities in majors traditionally considered pre-medicine or pre-dental, and (2) the pool of potential underrepresented minority applicants to the University of Connecticut's Schools of Medicine and Dental Medicine was limited.

When the University of Connecticut Health Center initiated its HPPI, less than 6% of the Connecticut's medical school applicant pool were underrepresented minorities, which was 50% of the national average for the same period. A major contributor to the low enrollment of underrepresented minorities was the small numbers of students earning bachelor's degrees in traditionally premedical majors in the state.

In the mid-1990s, Connecticut had one of the highest per capita incomes in the nation, but also it had significant poverty especially among urban families with children. The Hartford school system is one of seven major urban school districts in the state with more than 94% minority student enrollment. Connecticut's capital, Hartford, is one of the state's poorest cities and is located less than ten miles from the University of Connecticut Health Center campus.

The University of Connecticut Health Center's HPPI was the result of ongoing discussions with community and educational partners interested in and committed to the idea that a pipeline could be created and sustained that would expand the pool of qualified underrepresented minority students interested in careers in health care. Development of a Project Plan began in 1994 and the Pipeline was officially funded in 1996 through a grant from the Robert Wood Johnson Foundation.

Building a Pipeline

Prior to bringing community and educational partners together to discuss the feasibility of the HPPI, the associate and assistant deans of the health center's Department of Health Career Opportunity Programs met with University of Connecticut officials to gain support for the project. Meetings took place with the deans of the Schools of Medicine and Dental Medicine, the chancellor of the university, and members of the Board of Trustees. After securing institutional support and approval, representatives from urban school districts, community agencies, and institutions of higher education were invited to attend a planning retreat. A committee to develop the Project Plan was created at the planning retreat, which identified the goals and partners for the University of Connecticut's HPPI.

The HPPI's governance structure identifies the associate dean and director of the health center's Department of Health Career Opportunity Programs as the individual with overall responsibility for HPPI initiatives. This person reports directly to the deans of the Schools of Medicine and Dental Medicine. The assistant dean of the Department of Health Career Opportunity Programs has been the point person for coordinating the different

facets of the pipeline. Key to the success of the HPPI is the autonomy and decision-making power provided to each of the partners to ensure that the overall goal and mission of the pipeline is met. The department's education and development specialist works closely with the assistant dean and HPPI partners to set up both the program and evaluation pieces for the individual program components. Evaluation and outcome information is shared between partners and the health center in an ongoing and fluid manner so all the vested partners remain connected.

The educational partners in the HPPI are the University of Connecticut, Capital Community College, Central Connecticut State University, and Wesleyan University. As partners, each brings different resources and attracts different types of students for enrollment. Each partner has designated a site coordinator who is responsible for overseeing the Pre-College Enrichment Program as well as interfacing with the secondary and postsecondary HPPI programs. HPPI provides our college partners with a valuable recruiting tool for identifying and enrolling qualified underrepresented and educationally disadvantaged students.

The urban school district partnered with the University of Connecticut is the Hartford Public Schools, which has more than 24,475 students enrolled. Support for the HPPI is widely felt at all levels of the Hartford Public Schools, from the individual classroom all the way up to the superintendent's office. The HPPI provides valuable resources to the school district, which is challenged by large numbers of students who would be the first in their family to earn a four-year college degree, come from families where English is not the primary language, and come from very modest family incomes.

The community partner for the HPPI is the Connecticut Pre-Engineering Program (CPEP), a statewide program with established programs in Hartford and surrounding communities. As a community agency, CPEP provides valuable resources and programming as a HPPI summer program. HPPI gives CPEP students interested in careers in the health professions an option for summer enrichment and valuable program resources such as annual Bridge to the Future Mentoring Conference.

Autonomy in the selection of student participants and staff by all partners helps ensure smooth operation of the HPPI programs. All partners are expected to identify and recruit students based on grant funding eligibility and requirements.

Partnership Activities

The University of Connecticut's HPPI has 13 different programs and activities. (See [Table 1](#) for a list of all HPPI Pipeline Programs and activities.) For the purpose of this case study, only two are discussed in detail: The Pre-College Enrichment Program and the College Science Partnership Series. The Pre-College Enrichment Program, funded initially by a grant from the Robert Wood Johnson Foundation, and the College Science Partnership Series, funded primarily by the University of Connecticut Health Center, are examples of components within HPPI that document the success of the initiative. These two components directly address the issue of creating a pool of qualified underrepresented and educationally disadvantaged students who are interested in pursuing career opportunities in health care and related fields.

Table 1

University of Connecticut Health Center Health Professions Partnership Initiative Programs and Activities

Programs and activities	Target students	Description
Great Explorations Program	6 th –8 th grades	Provides after-school and summer enrichment activities for middle school students.
Jumpstart Program	9 th –10 th grades	A college preparatory program that provides academic-year and summer instruction and enrichment activities.
Hartford Public School District's Health Professions Academy (HPA)	9 th –12 th grades	A small learning community of 200 students that share high school teachers, enrichment activities to promote college and health professions access and preparation.
High School Summer Research Apprenticeship Program	12 th grade	A six-week immersion for high school students in research laboratories and faculty.
Mini Medical Series	11 th –12 th grades	An eight-week lecture series featuring UConn Health Center faculty members and clinicians.
Health Careers Discovery Program	11 th –12 th grades	A six-week non-residential program for high school students that provides college preparatory information and instruction.
Pre-College Enrichment Program	13 th grade	A six-week residential program operated at the three college partner campuses that combines academic instruction and immersion in the college experience.
Bridges to the Baccalaureate Program	13 th –15 th grades	A two plus two program that allows community college students to gain valuable research and work experience while earning a bachelor's degree at the University of Connecticut.
College Enrichment Program	13 th –14 th grades	A six-week residential program at the University of Connecticut with intense academic instruction and clinical exposure.
Medical/Dental Preparatory Program	13 th –15 th grades	A six-week program that provides two tracks of educational training and support, including DAT and MCAT preparation.
Summer Research Fellowship Program	15 th –16 th grades	A research experience studying basic or clinical medicine or dental medicine over a ten-week period at the UConn Health Center.
Post Baccalaureate Program	post-16 th grade	Intensive preparation in the sciences to strengthen medical and dental school preparation and competitiveness at the University of Connecticut.
BS/DMD Joint Degree Program	13 th –16 th grades	Combined degree program for students interested in dental medicine at the University of Connecticut and University of Connecticut School of Dental Medicine.

The Pre-College Enrichment Program

The Pre-College Enrichment Program (PCEP) is sponsored at each of the three college partners: Central Connecticut State University, Wesleyan University, and the University of Connecticut, Storrs Campus. A total of 45 incoming college freshmen participate in a six-week residential program that provides a rigorous academic immersion at the college level. Students participate in classroom and lab instruction in four core areas (math, English [reading, critical thinking, and problem solving], biology, and general chemistry). Students receive tutorial support as well as exposure to the college processes, such as help with financial aid and course selection. In addition, the PCEP students are afforded supplemental academic support throughout their college careers from the site coordinators at each campus. PCEP students' success is measured in a variety of ways. PCEP participants have a high rate of retention in college, as evidenced by the PCEP cohorts of 1996-2000 where 88% of student participants graduated from college.

The College Science Partnership Series

The College Science Partnership Series is sponsored in collaboration with the Hartford Public School District, Central Connecticut State University, and the University of Connecticut Health Center, one of several activities the health center sponsors for the Hartford Public School's Health Professions Academy. The academy, developed as part of the HPPI, served as a model in the development and implementation of small learning communities in the Hartford high schools. In 2004-2005, more than 130 Hartford students participated in ten biology and ten chemistry labs at Central Connecticut State University. Guided by university

faculty and students, the College Science Partnership Series provides valuable academic enrichment and college exposure. The College Science Partnership Series outcomes document that (1) students feel more motivated as a result of their involvement to continue their education beyond high school, and (2) students are more motivated about their science class and science in general as a result of participation

Lessons Learned

In the University of Connecticut HPPI's more than nine-year tenure, several valuable lessons have been learned. First and foremost, we learned the importance of limiting the scope of the project so it is manageable and fundable. Secondly, buy in and defining the role of each partner is critical for the success of the overall initiative.

Investment in HPPI is both financial and institutional. The extent of both types of investment should be sufficient to support the goals of the HPPI and diminish barriers that may exist. For example, during HPPI's tenure the Hartford Public Schools had six superintendents. Fortunately, since the health center's HPPI was formalized, change in personnel, such as that in the Hartford Public Schools leadership, has not negatively impacted the partnership. This stability is due to the fact that the Hartford Public Schools embraced HPPI on multiple levels, from classroom teachers all the way up to senior levels of the central administration of the school system.

It is also noteworthy to mention that students' success and retention continues to be high even after RWJ funds were exhausted. This is due, in part, to the infrastructure that was in place through the Department of Health Career Opportunity Programs, which was established in 1986. Student retention in college for PCEP participants during the period 1996-2005 was 93%.

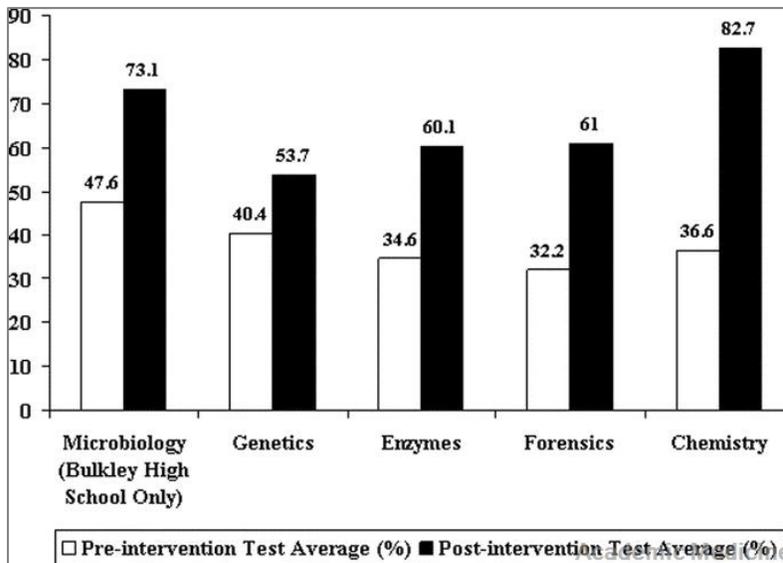
Finally, the success of HPPI is due, in part, to the identification and availability of adequate resources. The University of Connecticut's HPPI is supported by a diverse funding platform that includes private, public, and institutional funds. Identifying and maintaining adequate funding is an ongoing and critical process.

All elements of the HPPI are seen as valuable and worth maintaining. Initially, more partners were invited to participate in the HPPI, but in retrospect the number of partners could have been and should have been limited. This allows for a more simple design and allocation of resources.

Institutionalizing the Project

The University of Connecticut's HPPI is especially fortunate to have the leadership and administrative positions funded by the university. This has enabled the pipeline to maintain fluid, ongoing leadership and oversight of the programs. At the same time it has freed up extramural funding for other personnel costs.

The University of Connecticut's HPPI is seen as a successful program with proven results. Funding has come through a variety of sources, including one-time lump sum gifts, an endowment, and multiyear grants. Significantly, elements of the HPPI have recently been funded through an endowment grant, ensuring their operation in perpetuity. Since 1996, 137 student participants in the university's Health Career Opportunity Programs have successfully matriculated into medical and dental schools nationally.



Bulkeley/Weaver High Schools combined percentage of correct responses on pre-intervention and post-intervention testing conducted as part of the University of Connecticut Health Center's College Science Partnership Series, 2004-2005.

Virginia Commonwealth University: Junior Volunteers Opportunities at VCUHS

The Junior Volunteer Program provides students (ages 14-17) an opportunity to volunteer in a large, urban medical center where they are able to see the benefits of donating their time and services to their community. They are also given opportunities to develop and appreciate their own abilities, and to learn about career opportunities in the health care field.

Community College, College and University Models

The Health Careers Opportunity Program: Fresno State

The Health Careers Opportunity Program (HCOP) is an academic/extra-scholastic student support and resources program located on the campus of Fresno State. We are dedicated to serving students from economically and/or educationally disadvantaged backgrounds who have an interest in pursuing a career in the health and allied health professions - The University Fresno (Fresno State), College of Science and Mathematics and the University of California, San Francisco Fresno Latino Center for Medical Education and Research.

Once students reach the ranks of our university, as an HCOP student, we offer you a great deal of resources and assistance to help prepare you become competitive applicants for medical, dental, pharmacy, physical therapy and other health/allied professional schools and graduate programs. Health Careers Opportunity Program is a partnership between California State

Pre-Health Advising

Interested in health professions such as medicine, dentistry, optometry, pharmacy, veterinary medicine, or physical therapy? Besides providing basic information on such

careers, the purpose of HCOP is to assist current or prospective Fresno State students in the academic path to achieve their goals through advising and the locating of a pre-health advisor on campus. HCOP participants can schedule advising appointments with HCOP staff or come by during our walk-in hours

Peer Mentoring

Peer mentors are the backbone of HCOP. Peer Mentors implement retention activities, assist with career and educational planning, and coordinate with the Program Coordinator to implement mentoring and counseling for students. It is also important to acknowledge that Peer Mentors are one of the primary HCOP representatives responsible for interacting with students and for assisting students in dealing with academic, and some times, personal issues.

Health Professional Mentor Program (HPMP)

This program was developed on the premise that pre-med students will be more successful with early exposure, a professional role model, and support.

Health professional mentors are paired with first year undergraduate pre-med students for a four-year duration. Throughout this relationship, the mentor provides support and helps the student determine his or her direction. The student will have a chance to learn about the mentor's experience, discover options in healthcare professions, as well as explore his/her own thoughts and feelings about medicine.

This program is meant to foster a mentoring relationship between a health professional and a potential future health professional. Job shadowing is also a beneficial experience for a mentee and is strongly encouraged, but it should not be the primary focus of the mentor experience. Mentor/mentee relationship building can happen through phone conversations, coffee or lunch meetings, meetings at the university, attending a lecture together, etc. We recommend that the mentoring relationship continue for the four academic years.

- **Documentation (logs and journals)** – Mentees are required to submit documentation in the form of “health professional mentor activity logs” and “journals” to a Program Coordinator every month. Activity logs report the activity and duration of the mentor contact while journals document the mentee's experience.
- **Roundtable Discussion Participation** – It is important for mentees to attend mandatory roundtable sessions held at least once a semester. Roundtables are a setting for mentee participants to share their experiences, submit documentation, voice concerns, and provide program feedback.
- **Job Shadow Experience** - Mentees will have the opportunity to shadow their mentor at least once per year for a one hour minimum. Job shadow arrangements will be made by the mentor and his/her employer, if applicable. Mentees should not job shadow until all clearance arrangements have been completed with the mentor and his/her clinical site.

Academic Excellence Workshops

Academic Excellence Workshops are regularly held, weekly meetings (2 to 4 hours) to support excellence in foundation courses in mathematics, chemistry, physics, engineering,

or other technical subjects. Participants engage in structured activities that develop communications skills of students, their ability to work with others, and their mastery of the content.

Participants develop the bonds that create an *academic community* among the participants and create self-directed learners.

Activities

- On-going training for facilitators in group facilitating and learning.
- Students practice collaborative learning techniques (i.e., are NOT tutored or lectured) on challenging problems in the content area.
- Facilitators give students knowledge about the educational and technical culture and the transitions required for a successful adjustment from high school/community college.
- Students are guided to create peer support groups that meet outside of and in addition to the workshop.

University 1

This course is designed to assist students in obtaining skills and knowledge necessary to reach their educational objectives. Utilizing a combination of psychological, social, and physiological approaches University 1 provides an understanding of higher education and its lifelong impact on human development. Topics to be covered include adaptation to change, communication skills, study skills and techniques, goal setting, time management, career planning, library competence, wellness, human sexuality, aging, diversity, and related issues that have a continuing effect on individual growth. Students in University 1 become familiar with and explore various campus resources, and participate in individual and group activities.

COURSE GOALS: The goal of this course is to provide students with an opportunity to gain knowledge and develop skills that promote their adaptation to the culture of the University and the traditions of higher education. University 1 assists students in making a successful transition to higher education and provides an academic perspective for lifelong learning.

Professional School Preparation

Pre-professional course requirements prepare students for careers in the health sciences, medicine, dentistry, and pharmacy program, in addition to a variety of educational and vocational alternatives. Students are encouraged to pursue a formal degree program. Choice of a degree-oriented major depends on interest and alternate career plans. It is possible to fulfill professional school requirements and at the same time complete departmental requirements for almost any science major. An applicant must meet all of the pre-professional requirements regardless of undergraduate or graduate degrees held.

Personal Statements: One-on-one sessions to help students write personal statements are available.

Mock Interviews: HCOP offers mock interview opportunities. An interview can be scheduled with HCOP staff on an as need basis. We try to simulate a one on one interview situation. After the interview, the interviewer (physician, adjunct faculty, admissions personnel, health professional students) offers pointers on improving your physical presentation as well as offering constructive advice on answering some of the interview

questions. Your success at the interview depends on your personal effectiveness (eye contact, handshake, greeting, confidence, etc.) as well as your answers to questions, so practicing the interview is important.

Conferences

One of the objectives of HCOP is to assist students in the process of applying to health professional programs. One way of providing this assistance is by attending pre-professional conferences. HCOP provides transportation services to many of these events. We usually ask that students register for the conference, followed by a visit to the HCOP office where the student will sign-up to attend the event and leaving a refundable deposit (deposit is refunded at the time of boarding transportation). A couple of favorites are listed below (SUMMA, Dia De Los Muertos and California Forum for Diversity in Graduate Education).

Summer Medical and Dental Education Program (SMDEP)

SMDEP is a FREE (full tuition, housing, and meals) six-week summer academic enrichment program that offers freshman and sophomore college students intensive and personalized medical and dental school preparation.

History:

In 1988, The Robert Wood Johnson Foundation established the Minority Medical Education Program (MMEP) to increase the number of highly qualified medical school applicants from minority groups that were underrepresented in medicine—primarily African Americans, Hispanics, and American Indians. MMEP supported six medical schools in offering a free, six-week medical school preparatory program. The Association of American Medical Colleges assumed the role of National Program Office for MMEP in 1993.

Over the years, MMEP's intensive academic preparation program expanded to 11 campuses. In addition, the program broadened its initial focus on specific minority groups to include students who were from rural areas, economically disadvantaged, and came from groups that have historically received substandard health care regardless of their racial or ethnic background.

In 2003, the program changed its name to the Summer Medical Education Program (SMEP), reflecting the inclusion of students representing a wide range of economic, cultural, racial, and ethnic diversity. The Summer Medical and Dental Education Program (SMDEP) builds on the lessons learned from those earlier programs. It expanded to include pre-dental students who face challenges similar to those of pre-medical students, and it focuses on students in the first two years of their college education because the experience of previous programs indicates that this is when students derive the most benefit.

Program Offerings Include:

- Academic enrichment in the basic sciences (organic chemistry, physics, biology) and pre-calculus/calculus
- Career development
- Learning-skills seminar
- Limited clinical exposure
- A financial-planning workshop

Program Sites:

Case Western Reserve University, Columbia, Duke, Howard, UCLA, UMDNJ – New Jersey Medical and New Jersey Dental, U of Louisville, U of Virginia, U of Washington, U of Texas-Houston, Yale University

American Psychological Association

Ten years ago when APA looked at the diversity of psychology students from high school to the doctoral level, the association found that the higher you went, the fewer the number of ethnic-minority students. Today, that pipeline isn't nearly as leaky, thanks to a joint project by APA and the National Institute for General Medical Sciences (NIGMS).

Initiative: Developing Minority Biomedical Research Talent in Psychology: A Collaborative and Systemic Approach for Strengthening Institutional Capacity for Recruitment, Retention, Training and Research

With \$4 million in funding from NIGMS, APA organized this major initiative. The goal was to increase the number of ethnic-minority students ready for research careers. Now the initiative is coming to an end, due to changes in eligibility for NIGMS funding. And after 13 years of funding, the 14 institutions partnering with APA have demonstrated that addressing psychological barriers, providing intensive mentoring and making entire universities more welcoming to minority students can create what APA's Bertha Holliday, PhD, calls "a culture of diversity" that helps ensure that no research talent is wasted. "One lesson we learned is the importance of really changing institutional culture," says Holliday, senior director for ethnic-minority affairs. "It's not just about changing students, 'fixing' minority students up. It's about fixing the departments themselves."

Successful Results of APA/NIGMS at University of Chicago

Each of the project's five regional centers of excellence links a predominantly minority-serving community college, minority-serving four-year institution and major research university. Together they worked on conferences, research projects and other initiatives tailored to the specific needs of ethnic-minority students in their areas. Although each institution approached the project a little differently, says Holliday, what they have in common are results.

Since 1997, the project's 667 participating students have made 440 research presentations and published more than 80 scholarly articles. Eighty participants, or 60 percent of all two-year college participants, transferred from two-year institutions to four-year schools. And at least 268 students have received BA or BS degrees, at least 72 have pursued master's degrees, and 83 have entered PhD or PsyD programs, while another 39 have entered graduate professional programs, including medicine, law and social work. Several now hold tenure-track positions in psychology departments. Addressing both psychological and academic issues has helped make the project a success at Chicago State University, says psychology department chair Ivy M. Dunn, PhD.

A lack of confidence can keep African-American students from pursuing research careers, says Dunn. "To a student who secretly feels like, 'I can't do this,' even the best classes and best teachers aren't going to help," she says.

To boost students' confidence, the Chicago State University APA/NIGMS project brought in a counselor to help students assess and improve their belief in their own academic and intellectual powers and initiated a peer mentoring program, and thereby significantly increased retention rates.

Project leaders also linked budding researchers with role models by taking them to psychology conferences. "Some of our students don't know about research careers and have never met a person of color who does research," Dunn explains. A summer research program gave students the chance to help faculty members with research or tackle projects of their own.

That close contact with faculty members is in itself a way to increase students' confidence, says Dunn. "That makes them feel important."

APA/NIGMS at University of Miami - Psychology Research Initiative Mentorship Experience

The centerpiece of U of Miami's APA/NIGMS project was a 10-week summer research program called the Psychology Research Initiative Mentorship Experience (PRIME). Participating students work in psychology labs, where they learn firsthand about research careers, says psychology department chair Rod Wellens, PhD. This lab experience also serves as a resume-booster for grad school applications.

At summer's end, students present their research in poster sessions. "It gives students a preview of what it would be like to participate in a professional conference or to go on a job interview," says Wellens. "We also publish a book of abstracts they can point to when they are putting together their applications or CVs."

The program has been so successful that the department has found additional funding and opened it to non-minority students.

"The project has done much more than we ever anticipated in terms of how we train students in general, not just minority students," says Victoria Noriega, PhD, director of undergraduate studies in psychology at UM and coordinator of the summer program. "It forced us to think about the importance of early research mentoring."

Noriega has completely overhauled the department's relationship with undergraduate students with a unique orientation, advising and mentoring program called FACT FORUM (Freshman Advising Contact Term and Faculty Overview of Research and Undergraduate Mentoring). She assigns incoming freshmen to groups of 10 to 15 students who meet with her and a peer adviser weekly to discuss the nature of scientific psychology, explore possible double majors and minors, find out about the importance of and how to get involved in research, and develop graduation plans to make the most of their undergraduate educational experience. During the second semester students meet in small groups with a faculty member whose research interests them to discuss research in general, in the department, and in the faculty member's own lab. Exposure to research topics in the news and to primary source journal articles is an important part of the program. Many undergraduates go on to work in their mentor's lab. The combined result of the PRIME and FACT FORUM programs has resulted in a dramatic increase in the number of students pursuing a more in-depth experience in psychology—41 percent of students funded by the project went on to complete a senior honors thesis.

APA/NIGMS at University of South Dakota - Native Students Services Program

At the University of South Dakota in Vermillion, the APA/NIGMS initiative has sparked changes that go beyond the psychology department to affect the entire university. Native Americans represent almost 10 percent of the state's population but just 2 percent of the university's student body, says psychology professor Beth Boyd, PhD. It can be hard to get Native American students to enroll and even harder to keep them in school, she says. In the 2004–05 school year, the retention rate for full-time Native American freshmen was just 23 percent.

"It's really tough for them to stay here, especially when there's something going on back home," says Boyd. "They feel so disconnected from their families."

The solution? To create a more family-like environment at the university. The initiative focuses on students in their first and second years, which Boyd says is when students are most likely to drop out. "We just make sure they get connected to somebody and stay connected," she says.

With support from the APA/NIGMS project, Boyd and her colleagues established a Native student services program. Housed in the campus's Native American cultural center, the program offers mentoring, tutoring and cultural activities that help students feel supported.

The department also created a Council of Indigenous Advisors—a group of elders drawn from the university and local community who maintain close ties to their traditional cultural and spiritual practices while flourishing in mainstream society.

In addition to serving as mentors for the students, the elders help university psychologists develop culturally appropriate courses and practica. "They also spend a lot of time with students who are having a difficult time or just want to talk to an elder," says Boyd. The entire university now draws upon this resource, says Boyd.

These and other efforts have improved retention rates for Native American students. By the 2007–08 school year, the retention rate for Native American freshmen had jumped to 84 percent.

"Unless students feel connected here in terms of their culture, they're not going to stay," says Boyd. "Just like any student, they really need a lot of support besides the academic kind."

Resources for Teacher Development

Baylor College of Medicine Public School Teacher Programs

Baylor College of Medicine, one of the nation's premier scientific research institutions, has more than 30 years of experience in conducting science education programs for and with area teachers, schools and districts. BCM's Center for Educational Outreach has developed more than 15 science curriculum units that offer an integrated approach to science, mathematics and literacy; partnered with The Children's Museum of Houston on a permanent exhibit and a traveling exhibit; and created/conducted leadership and science professional development programs for teachers in Houston and across the U.S.

Professional Development Solutions

CEO professional development workshops provide unique and fun learning experiences. Scientists and master teachers present the latest science content, along with strategies to address the elementary TAKS test. Printed materials, black-line masters, suggestions for integrating science with other subject areas, and step-by-step instructions are all provided. Follow-up sessions can be offered throughout the school year. Workshops normally are held at the John P. McGovern Campus.

All sessions model appropriate questioning techniques, differentiated instructional methods, strategies for authentic formative and summative learning assessments, and gender/ethnic neutral instructional approaches. Teachers learn each activity by working together in teams. Connections to mathematics, reading and language arts, social studies, art and health enable teachers to teach science as part of an integrated whole, and therefore, afford more time for science.

All teaching strategies, content information and activities covered in CEO professional development workshops follow national and state standards for the teaching of science and mathematics.

In addition to workshops held at the John P. McGovern Campus, teachers also may participate in online professional development courses found on the BioEd Online (appropriate for high school teachers) and K8 Science for elementary and middle school teachers) websites. Both online resources utilize state-of-the-art technology to give you instant access to online professional development, reliable, cutting-edge life science information and educational tools for biology and related subjects.

The Science of Food and Fitness: For Middle School Teachers

Funded by the National Space Biomedical Research Institute through a cooperative agreement with the NASA, Baylor College of Medicine's The Science of Food and Fitness teacher's guide offers students and teachers an opportunity to explore the latest nutrition and fitness findings in space biology research.

The Science of Food and Fitness workshops assist teachers in using the guide in the classroom. Workshops are held locally and nationally, and participants earn CPE Approved Professional Development Hours.

SELF Program: For Elementary and Middle School Teachers Science Education Leadership Fellows

The Science Education Leadership Fellows (SELF) program brings elementary educators and scientists together as true partners. Scientists work with their partner teachers in classrooms. Educators gain knowledge and confidence in science, and conduct a short research project in collaboration with their partner scientists. Together, teachers and scientists learn about national science education reform programs, enhancing student interest and performance in science, and innovative teaching materials. This program requires a two-year commitment from both scientists and educators.

Summary

Two-year program: Ten teachers and five scientists are selected each year. Teams consist of one scientist and two teachers. Participants attend monthly Friday-Saturday or Saturday sessions during Year One, and three Saturday sessions in Year Two. Compensation for "sub days" is provided for certain districts.

Three-week summer research experience occurs between Years One and Two.

Compensation

Stipend of \$1,500 awarded at the end of the summer research section of the program.

Stipend of \$500 awarded upon completion of Year Two.

BioEd Online: Biology Teacher Resources from Baylor College of Medicine/ K8 Science: For Elementary School and Middle School Science Teachers

The Center for Educational Outreach at Baylor College of Medicine offers a dynamic online educational resource for science teachers. K8 Science utilize state-of-the-art technology to give you instant access to reliable, cutting-edge information and educational tools for biology and related subjects. Our goal is to provide useful, current, and high-quality information and materials that build upon and enhance the skills and knowledge of science educators.

Through these programs the following peer-reviewed resources are available.

- **Online Workshops.** Free, web-based "anytime, anywhere," workshops and short courses are offered on BioEd Online and K8 Science for teacher professional and other life-long learners. Content is presented by teachers, scientists and science educators. A certificate for "contact hours" is available upon completion of each workshop or short course.
- **Streaming Video Presentations.** View timely presentations given by thought leaders on education in biology and related subjects, classroom management, science standards, and other issues in education. Presentation topics include content reviews for prospective biology teachers, content updates for experienced teachers, research lab technique demonstrations, inquiry science, and assessment. In addition, BioEd Online offers helpful presentations for teachers in training as they prepare for the classroom experience.
- **Slide Sets.** Customize exciting and relevant lesson plans and activities from hundreds of searchable slides developed by BioEd Online's Editorial Board and contributors. The slide library is updated regularly. Each slide is complete with talking points and references, and can be downloaded into your own PowerPoint program for personal educational use.
- **Classroom Lessons.** Download free, inquiry-based, hands-on activities, in PDF format, created by scientists and educators at Baylor College of Medicine. Each activity is aligned with the National Science Education Standards.
- **Podcasts Plus Lessons - Symposium for Space Life Science.** Bring "Podcasts Plus Lessons" or the online series "Symposium for Space Life Science" to the classroom.

Both Space Life Science series include downloadable slide sets and video presentations.

- **Editors' News Picks.** Stay current with science news selected by BioEd Online's Editorial Board. Check back each week for new science stories and related discussion questions to complement your ongoing science activities, and to stimulate an exchange of ideas in your classroom. All Editors' Picks are maintained in our archive for easy access whenever you need them.
- **Nature Science Updates.** BioEd Online is proud to provide a continuous biology news feed directly from Nature, one of the most respected science journals in the world.

For a list of more programs available for teacher development, please visit:

http://www.ccitonline.org/ceo/content.cfm?content_id=184

Available Grant

HRSA State Loan Repayment Programs

In addition to the National Health Service Corps Loan Repayment Program, the Health Resources and Services Administration State Loan Repayment Program provides matching funds to more than 30 states to operate their own loan repayment programs for primary care clinicians working in Health Professional Shortage Areas.

Eligibility requirements and benefits vary; contact your state program for more information.

Health Careers Opportunity Program (HCOP)

Catalog of Federal Domestic Assistance Number: 93.822

Program web site: <https://grants.hrsa.gov/webExternal/FundingOppDetails.asp?FundingCycleId=79A96BF3-93A1-4595-8897-0413D6C0DF4D&ViewMode=EU&GoBack=&PrintMode=&OnlineAvailabilityFlag=&pageNumber=&version=&NC=&Popup=>

Sponsor: Bureau of Health Professions

Deadlines June 1, 2010

Purpose The goal of the Health Careers Opportunity Program (HCOP) is to assist individuals from disadvantaged backgrounds to undertake education to enter a health profession. The HCOP program works to build diversity in the health fields by providing students from disadvantaged backgrounds an opportunity to develop the skills needed to successfully compete, enter and graduate from health professions schools. The legislative purposes, from which HCOP funds maybe awarded are: 1) identifying, recruiting and selecting individuals from disadvantaged backgrounds for education and training in a health profession; 2) facilitating the entry of such individuals into such a school; 3) providing counseling, mentoring, or other services designed to assist such individuals to complete successfully their education at such a school; 4) providing, for a period prior to the entry of such individuals into the regular course of education at such a school, preliminary education

and health research training designed to assist them to complete successfully such regular course education at such a school, or referring such individuals to institutions providing such preliminary education; 5) publicizing existing sources of financial aid available to students in the education program of such a school or who are undertaking training necessary to qualify them to enroll in such a program; 6) paying scholarships, such as the Secretary may determine, for such individuals for any period of health professions education at a health professions school; 7) paying stipends for such individuals for any period of education in student-enhancement programs (other than regular courses), except that such a stipend may not be provided to an individual for more than 12 months; 8) carrying out programs under which such individuals gain experience regarding a career in a field of primary health care through working at facilities of public or private nonprofit community-based providers of primary health services; 9) conducting activities to develop a larger and more competitive applicant pool through partnerships with institutions of higher education, school districts and other community-based entities.

Eligibility

Eligible applicants include schools of medicine, osteopathic medicine, public health, dentistry, veterinary medicine, optometry, pharmacy, allied health, chiropractic, podiatric medicine, public or non-profit private schools that offer graduate programs in behavioral and mental health, programs for the training of physician assistants, and other public or private nonprofit health or educational entities, including faith-based organizations and community-based organizations.

A funding preference will be given to approved applications for programs that involve a comprehensive approach by several public or nonprofit private health or educational programs that will result in the development of a competitive applicant pool of individuals from disadvantaged backgrounds who desire to pursue health professions careers.

Geographic coverage: Nationwide

Expected Number of Awards: 3

Estimated Total Program Funding: \$3,000,000

Application process HRSA is requiring applicants for this funding opportunity to apply electronically through Grants.gov. All applicants must submit in this manner unless the applicant is granted a written exemption from this requirement in advance by the Director of HRSA's Division of Grants Policy or designee.

A link to the application is available through Grants.gov at:

<https://grants.hrsa.gov/webExternal/FundingOppDetails.asp?FundingCycleId=79A96BF3-93A1-4595-8897-0413D6C0DF4D&ViewMode=EU&GoBack=&PrintMode=&OnlineAvailabilityFlag=&pageNumber=&version=&NC=&Popup>

For more information contact:

Kyle Peplinski

E-mail: KPeplinski@hrsa.gov

Phone: (301) 443-7758

Important Components of Successful Pipeline Programs

- **Leadership and Accountability – Multi-institutional Partnerships:** Successful Programs should be a combined effort from state legislature, state government agency, public schools k-12 schools, community organizations and public/private universities. For example, UConn involves its state legislature by inviting representatives to visits its programs as a way of familiarizing them with the benefits and needs so they will sponsor funding measures. Each institution needs a point person whose job it is to strategize collaborative components with the other schools. Leaders should be held accountable to both internal and external constituencies, primarily community members and the partnerships must be equal.
- **Resources:** Work must be prioritized and resources must be allocated accordingly. Diversity programs require institutional support (financial and properly staffed personnel) in order to be effective. Pipeline programs that are strategically planned and have demonstrated solid commitment throughout all levels of the institutional hierarchy are more likely to be successful. There is a direct monetary rate of return on investing in such programs as successful programs become the recipient of millions of dollars worth of grants.
- **Accreditation:** Make incorporating diversity an accreditation requirement at medical/dental institutions.
- **Mentoring:** Providing students with partners whom come from similar backgrounds and are already well on their way to navigating the system is key to reminding students that they can be successful.
- **Hands-on:** Programs should allow students to both venture onto college campuses, and participate in work that is hands-on and applicable to real life situations.
- **Resources for Teachers:** University programs should provide public school teachers with up-to-date and innovative research and tools for engaging students.
- **Programs must begin early** and persist throughout schooling
- **Community:** Programs should provide opportunities for students to participate in internships and practicum experience in their own communities. The University of South Dakota and two tribal colleges work through the Council of Indigenous Advisors help provide students with opportunities to work on reservations in order to show students how they can assist their own communities.
- Institutionally underserved minorities need to be hired into senior level administrative and tenured faculty positions.
- **Admissions criteria** should focus on candidates more holistically, with less focus on test scores and other historically used academic indicators, which do not necessarily measure intelligence or competence.
- **PR:** Programs should include Public relations campaigns that both target underserved communities and educate stakeholders about the importance of removing barriers and diversifying the workforce.
- **Shortage of African American Men in Pipeline:** Successful programs need to address the experiences of individual groups, not simply the blanketed experiences of all people of color. Specifically, African American men are significantly underrepresented on educational campuses (even in comparison to other ethnic groups. For example, in a Virginia-Nebraska Alliance pipeline program that is 80 percent female and 20 percent

male, as well as the undergraduate programs (60 percent female-40 percent male) in the Texas A&M University Health Sciences Center/Prairie View A&M University program. The Morehouse School of Medicine saw its first class in 1978 enroll 60 percent men, today only one-third of the students are men.

In response, the Virginia-Nebraska Alliance is partnering with the organization, 100 Black Men of Omaha, which provides mentors from 5th grade upward to keep boys in school. Another program switched from a coed math and science summer camp program to a boys-only session and saw a dramatic increase in enrollment. Successful programs need to address individuals.