



# Pipeline, Profession & Practice: Community-Based Dental Education

## An RWJF national program

Pipeline, Profession & Practice: Community-Based Dental Education (known as the Dental Pipeline Program) helped dental schools increase access to dental care for underserved populations from 2001 to 2010. Twenty-three dental schools participated in one of two rounds of the program: 19 funded by the Robert Wood Johnson Foundation (RWJF) in Round 1 and 2, and four funded by the California Endowment<sup>1</sup> in Round 1 and 2.

Round 1 focused on community-based clinical education programs, revising dental school curricula to support these programs, and increasing recruitment and retention of underrepresented minority and low-income students. Round 2 focused on replicating the best practices from Round 1 related to recruiting underrepresented minority and low-income students and providing care to underserved patients through service-learning experiences in community settings. RWJF authorized the Dental Pipeline Program for up to \$23 million (\$19 million for Round 1 and \$4 million for Round 2).

## CONTEXT

In 2000, the U.S. Department of Health and Human Services issued *Oral Health in America: A Report of the Surgeon General*,<sup>2</sup> the first-ever report by the surgeon general on oral health. Although it acknowledged the progress made in the reduction of common

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<sup>1</sup> During Round 1, RWJF funded 11 dental schools (including one in California) and The California Endowment funded four additional California dental schools. In Round 2, RWJF funded eight other dental schools and the California Endowment continued to fund the same four California dental schools.

<sup>2</sup> U.S. Department of Health and Human Services. *Oral Health in America: A Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000. Available [online](#).

oral diseases in the United States, the report found “profound and consequential oral health disparities within the U.S. population.” Social, economic, cultural, and demographic factors influence access to dental care. Minorities (Blacks, Hispanics, and American Indians) and the medically disabled have the least access and poorest oral health.

The dental care safety net is very limited. Public coverage, such as Medicaid, is minimal for adults, and many eligible children are not enrolled in available programs. Medicaid payments are so low that many dentists do not accept Medicaid. In the early 2000s, public and voluntary clinics serving low-income patients cared for only about 7.5 million people, while tens of millions of other people lacked access to dental care.

### **The Role of Dental Schools in Providing Care to the Underserved**

Although dental schools alone cannot solve the dental care access problems of the underserved, they can and should contribute to the solution through their educational and patient care programs. A 1995 Institute of Medicine report, *Dental Education at the Crossroads: Challenges and Change*,<sup>3</sup> recommended that dental educators, practitioners, researchers, and public health officials “work together to increase access to care and improve the oral health status of underserved populations” by:

- Securing more funding for personal dental services, public health and prevention programs, and community outreach, including activities undertaken by dental students and faculty
- Addressing the needs of underserved populations through research, curriculum content, and patient services

In 1999, a special issue of the *Journal of Dental Education*, funded by the Josiah Macy Jr. Foundation, reported on the status of community dental education programs developed by a few dental schools. At that point, the time seemed right for dental schools to focus greater attention on the problems of the underserved, according to program Co-Director Howard L. Bailit.

### **RWJF’s Interest in This Area**

The *Dental Pipeline Program* brings together two long-standing RWJF interests: increasing diversity in the health professions and improving oral health in America.

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<sup>3</sup> Field MJ, Ed. *Dental Education at the Crossroads: Challenges and Change*. Washington: National Academy Press, 1995. Available [online](#).

## ***Increasing Diversity in the Health Professions***

RWJF has long been concerned with disparities in access to health care for minority groups. Its strategies to address the problem have included efforts to expand the number of health care professionals from underrepresented minorities, including providing scholarships and developing a "pipeline" of qualified students who can apply successfully to medical, dental, and other graduate health professions schools.

### **Scholarships for Minority and Low-Income Medical and Dental Students**

From 1972 to 1977, RWJF funded scholarships for minority and low-income medical and dental students through its *Medical Student Aid Program* and *Dental Student Aid Program* (\$10 million and \$4.1 million, respectively). These programs provided financial support for students who would be likely to work in underserved areas so that school debt would not prevent them from doing so.

In the 1990s, RWJF provided \$5 million in support for minority medical students through the National Medical Fellowships. (See [Program Results](#).)

### **Developing the Pipeline**

Providing scholarships to those few minority students who entered medical and dental school was insufficient to address the shortage of health care professionals from underrepresented minorities. RWJF funded programs to build a pipeline of students who had the training and encouragement necessary for successful admission to health professions schools. These included:

- The \$13 million *Preprofessional Minority Programs* initiative (1972–94), which provided summer enrichment to promising minority college students. It also encouraged collaboration among medical schools and undergraduate colleges in organizing counseling, tutoring, and specially tailored premedical courses.
- The \$67.8 million *Summer Medical and Dental Education Program* (1987 through October 2013), a six-week summer residential program that strengthens the knowledge and skills of minority college students to increase their chances of getting into medical school. The program was expanded to include students interested in applying to dental school in 2005. (See [Program Results](#).)
- The \$7 million *Health Professions Partnership Initiative* (1994–2008), which established partnerships among health professions schools, undergraduate colleges, K–12 school systems and community-based organizations to prepare students academically for application to medical school and other health professions schools. (See [Program Results](#).)

## **Improving Oral Health in America**

RWJF also has been concerned about the quality of oral health in America since its earliest days in the 1970s. It has addressed poor oral health as a community health issue, a policy and financing issue, and a workforce issue.

The *Dental Pipeline Program* fit under RWJF's strategy of addressing oral health as a community health issue. For more information about RWJF work on oral health as a policy and financing issue and a workforce issue, see [Appendix 1](#).

### **Oral Health as a Community Health Issue**

From 1978 to 1981, RWJF funded the \$10 million *Hospital-Sponsored Ambulatory Dental Services Program* to help more Americans, particularly low-income Americans, get the dental care they needed. It helped 25 hospitals—most of them in low-income communities—enlarge their existing general practice dental residency training programs. (See Paul Brodeur's 2001 RWJF *Anthology* [chapter](#).)

In the 1990s, RWJF funded projects to place free or low-cost dental clinics in underserved communities, including:

- A network of clinics in low-income communities in RWJF's home state of New Jersey (1992 to 1995).
- Funding to help Oral Health America develop a plan for its five-year Dental Enterprise Zone program, which aimed to establish 20 model dental practices in underserved and impoverished communities across America (1997 to 1998). (See [Program Results](#).)
- Supporting school-based dental clinics in Huntsville, Ala., and the Bronx, N.Y., as part of its \$2.64 million *Center for Health and Health Care in the Schools* program (2001 to 2005). (For more information, see Program Results on [the center](#), and also on the [Huntsville project](#) and the [Bronx project](#).)
- Helping to establish the Good Samaritan Health and Wellness Center, which provided medical and dental care to approximately 5,000 underserved people in rural Georgia (2002 to 2004). (See [Program Results](#).)

## **THE DENTAL PIPELINE PROGRAM**

RWJF's *Dental Pipeline Program* included two rounds of funding. Round 1 ran from July 2001 to July 2007. The success of Round 1 as shown by its evaluation led to a renewal of the program and Round 2, which ran from August 2007 to July 2010.

## Program Design: Round 1

Judith Stavisky, MPH, MEd, the original RWJF program officer for the *Dental Pipeline Program*, and other RWJF program staff members spent several months interviewing dental experts, practitioners in the field, and academics, who suggested that the Foundation begin to correct the access disparity issue by starting at the dental schools. "That is not where we originally had thought to begin the corrective course," said Stavisky, "so this program was genuinely informed by a field we were very unfamiliar with until we conducted the interviews and meetings and met with several dozen folks."

Based on these consultations, RWJF designed the program at the dental school level—to help up to 10 dental schools increase access to dental care for underserved populations. (RWJF funded the 11th school one year later.) To accomplish this, the program required schools to do three things:

- Establish community-based clinical education programs
- Revise dental school curricula to support community-based education programs
- Take action to increase recruitment and retention of underrepresented minority and low-income students

All accredited dental schools in the United States and Puerto Rico at the time were eligible to apply for the *Dental Pipeline Program*. Grant awards would be for up to \$1.5 million each, over five years. The program required participating schools to allocate at least 25 percent of the funding to the recruitment component.

Participating schools would have 12 months to build the academic and clinical infrastructure necessary to implement the program, followed by 48 months to operate the program.

### **Community-Based Clinical Education**

In the fifth and final year of the program, RWJF expected schools to have senior students (and dental residents at the California schools) spend an average of at least 60 days providing care to underserved patients in community clinics and practice settings. RWJF anticipated that the schools would acquire sufficient community-based clinical capacity (e.g., in community health centers, private dental offices, schools, and hospitals) through partnerships with community organizations, state/local dental associations, public health departments, and so on.

RWJF also required the community-based dental faculty to:

- Have faculty appointments
- Attend an orientation meeting and have calibration training in student supervision

## **Curriculum Revision**

In order to benefit fully from the community experience, students needed a strong foundation in public health and the behavioral and social sciences. They also needed practical courses on the efficient delivery of culturally competent, patient-centered care to low-income, minority, medically disabled, and urban or rural patients. The development and implementation of such courses were key components of the *Dental Pipeline Program*.

## **Recruitment of Underrepresented Minority Students**

When the program began in 2001, two participating schools had well-established programs for recruiting minorities underrepresented in dentistry. These two programs were selected because they provided a role model for the other schools.

Participating schools could use *Dental Pipeline* funds to develop new recruiting and retention initiatives but could not substitute grant funds for other sources to support similar activities.

## **The Program: Round 1**

In April 2001, the RWJF Board of Trustees authorized up to \$19 million for Round 1 of the *Dental Pipeline Program* for 72 months.

## **Management**

### **National Program Office**

To manage the *Dental Pipeline Program* and provide technical assistance to its grantees, RWJF established a national program office at the Columbia University School of Dental and Oral Surgery (now named the College of Dental Medicine). The program office later moved to the Center for Family and Community Medicine at Columbia University Medical Center. Two individuals served as co-directors of this program:

- Allan J. Formicola, DDS, MS, former dean at Columbia University School of Dental and Oral Surgery and professor of dentistry in the dental school and the Center for Family and Community Medicine. Formicola is now dean emeritus and professor emeritus.
- Howard L. Bailit, DMD, PhD, until 2005 professor and director of the Health Policy Center at the University of Connecticut Health Center. Bailit has since become an emeritus professor.

Formicola and Bailit had worked together previously on other projects and each brought different expertise: Formicola in the area of dental education and Bailit in working with

stakeholders and program management. They shared planning and overall responsibilities for the program. The deputy director until June 2009 was Kim D'Abreu.<sup>4</sup>

Although both directors worked with all of the grantees, each took particular interest in monitoring about half of the grantees. Bailit was the main connection with the California schools funded by the California Endowment (see [California Schools](#)). Formicola focused on the other schools and had day-to-day responsibility for the operation of the national program office.

National program office staff monitored the activities and progress of the grantee schools and provided technical assistance that included:

- Annual meetings of grantees, national program office staff and evaluators
- Conference calls
- One-on-one consultations
- A program website: [www.dentalpipeline.org](http://www.dentalpipeline.org)
- Newsletters and articles
- Consultants

For more information about the national program office's activities, see [Appendix 2](#).

### **National Advisory Committee**

A national advisory committee of experts in dental education and public health selected the grantees and provided guidance to the national program office throughout Round 1 of the program. See [Appendix 3](#) for a list of Round 1 committee members.

### **Program Implementation**

National program staff issued a call for proposals in the fall of 2001, asking for a letter of intent to apply. Forty-two of the then 55 U.S. dental schools submitted letters of intent. The national advisory committee selected 21 schools, and staff invited those schools to submit full proposals. They included both established schools and those that were starting up programs.

Nineteen schools submitted full proposals. National advisory committee members selected 10 schools for participation, with one alternate. When funds became available after the initial awards, staff awarded a grant to the alternate school as well. The 11 participating schools were:

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<sup>4</sup> D'Abreu became associate director of the Center for Education Policy and Research at the American Dental Education Association in June 2009. She is now senior vice president for Access, Diversity, and Inclusion at ADEA.

- Boston University School of Dental Medicine
- Howard University College of Dentistry
- Meharry Medical College School of Dentistry
- Ohio State University College of Dentistry
- Temple University School of Dentistry (the alternate)
- University of California, San Francisco, School of Dentistry
- University of Connecticut School of Dental Medicine
- University of Illinois at Chicago College of Dentistry
- University of North Carolina at Chapel Hill School of Dentistry
- University of Washington School of Dentistry
- West Virginia University School of Dentistry

Three schools are private institutions (Boston University, Howard University, and Meharry Medical College). The others are public institutions.

The five-year grants started September 1, 2002, with the exception of the grant to Temple University School of Dentistry, the alternate, which was awarded on March 1, 2003. Seven of the 11 schools completed their grants on August 31, 2007. The others received extensions; one completed the grant as of May 31, 2008, and three as of August 31, 2008.

See [Appendix 4](#) for grant details.

### California Schools

Of the five California dental schools, the University of California, San Francisco School of Dentistry, was selected by RWJF for participation in the *Dental Pipeline Program*. RWJF Program Officer Judith Stavisky knew that the California Endowment was working on dental issues and approached its staff about helping to fund the program. As a result, the California Endowment and RWJF collaborated to include the other four dental schools so that all of the California schools existing at that time participated in the program.

The California Endowment funded:

- Loma Linda University School of Dentistry
- Ostrow School of Dentistry of University of Southern California
- University of California at Los Angeles School of Dentistry

- [University of the Pacific Arthur A. Dugoni School of Dentistry](#)

The four-year grants to these four dental schools started in July 2003 with a six-month planning period and ended in June 2007. They were full participants in the program, adhering to the same objectives (plus a fourth policy-related objective specific to California), receiving technical assistance from the national program office, and attending all annual meetings.

Thus, a total of 15 dental schools participated in Round 1 of the *Dental Pipeline Program*.

The California Endowment invested \$6.3 million from 2003 to 2007. Ignatius Bau, JD, program officer at the California Endowment, noted, "From the get-go, it was collaborative ... collaboration was a real goal."

### Focus Groups and Interviews

To learn about the challenges minority students experience in their pursuit of a career in dentistry, staff subcontracted with Lake Snell Perry & Associates<sup>5</sup> to conduct focus groups and interviews with undergraduate college students, dental students, and their faculty advisers at six *Dental Pipeline Program* schools.

### Special Mentoring Grant Program

The national program office launched the Dental Pipeline Connections Supplemental Grant program on September 15, 2007. Staff awarded four schools \$50,000 grants to develop mentoring programs for prospective and enrolled dental students who were members of underrepresented minorities. The schools were:

- Meharry Medical College School of Dentistry
- Ostrow School of Dentistry of University of Southern California
- University of Connecticut School of Dental Medicine
- University of Illinois at Chicago College of Dentistry

The [American Dental Education Association](#) evaluated the mentoring program under a subcontract from the national program office.<sup>6</sup> See [Appendix 5](#) for details about the evaluation of the Dental Pipeline Connections Supplemental Grant program and key findings.

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<sup>5</sup> Lake Snell Perry (now called [Lake Research Partners](#)) is a national public opinion and political strategy research firm headquartered in Washington.

<sup>6</sup> The evaluation included all of the schools except the University of Southern California School of Dentistry, which began its mentoring program too late to be evaluated.

## Financial Aid

Co-Director Formicola introduced Stavisky to program staff at the W.K. Kellogg Foundation, which provided \$1 million to fund financial aid for low-income and underrepresented minority students at the 11 RWJF-funded schools. The California Endowment made similar funds available for the four schools it funded. The American Dental Education Association administered scholarships or loans to 161 students.

### **Challenge: Recruiting Low-Income Students**

Although RWJF intended that schools participating in the *Dental Pipeline Program* would recruit both underrepresented minority and low-income students, the schools, the national program office, and the funders ended up focusing primarily on underrepresented minority students.

It turned out that the schools did not have family income data on applicants or enrollees, making it difficult to identify low-income students.

Other challenges in recruiting low-income students into dental school are their lack of positive exposure to dentistry and the cost of dental school, according to Stavisky.

As a result of these challenges, recruitment efforts focused on underrepresented minority students. That was fine, according to Stavisky and the national program office, as the program aimed to increase the number of underrepresented minority students in dental school, whether or not they were low-income.

Evaluators collected and reported some data on low-income students and their perspectives on recruitment compared with those of underrepresented minority students. See [Overall Program Results: Round 1](#) section on Recruitment of Underrepresented Minority and Low-Income Students.

### **Evaluation**

Researchers at the University of California, Los Angeles, evaluated the *Dental Pipeline Program*. Ronald M. Andersen, PhD, led the national Round 1 evaluation team, which also included Pamela Davidson, PhD, as co-investigator and study director and John Gutierrez as project manager.

The Round 1 evaluation focused on the extent to which the program achieved:

- Its three major objectives:
  - Establish community-based clinical education programs
  - Revise dental school curricula to support community-based education programs

- Take action to increase recruitment and retention of underrepresented minority and low-income students
- Longer-term outcomes that included:
  - Graduates' practice plans
  - Program sustainability
  - Policy reform (at the request of the California Endowment)

Planning for the evaluation occurred at the same time that the participating schools designed their projects, which was optimal, according to the evaluators. RWJF provided a one-year planning grant<sup>7</sup> in 2002, followed by two evaluation grants<sup>8</sup> over six years (2003 to 2008). The California Endowment provided funding starting in 2003 for the evaluation of the schools it funded.

RWJF designed the program with the requirement that the funded schools participate in the evaluation. To facilitate the evaluation, after the schools were selected, the national program office required them to use part of their grant funds to support a faculty-level evaluation liaison to assist evaluators with data collection.

The overall evaluation design was quasi-experimental, in which the evaluators compared outcomes from the Pipeline schools with those from non-Pipeline schools. In addition to cross-site comparisons, evaluators also prepared case studies for each school, with the exception of Temple University, the alternate.

The major evaluation data sources included the following:

- Site visit interviews
- Review of documents from the sites
- American Dental Education Association Survey of Senior Dental Students and American Dental Association Survey of Pre-Doctoral Dental Education
- A faculty survey

For details about the evaluation methodology, see [Appendix 6](#).

A more detailed description of the evaluation design and methodology also is included in an article entitled "[Methods for Evaluating Change in Community-Based Dental](#)

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<sup>7</sup> ID# 43528

<sup>8</sup> ID#s 45592 and 58942

Education" in a special evaluation monograph published in 2009 as a supplementary issue of the *Journal of Dental Education*.<sup>9</sup>

## OVERALL PROGRAM RESULTS: ROUND 1

Evaluators reported overall results from the 15 schools (11 funded by RWJF and four funded by the California Endowment) engaged in Round 1 of the *Dental Pipeline Program* in a special supplement<sup>10</sup> to the *Journal of Dental Education*, published in February 2009. The supplement is available [online](#). See the [Bibliography](#) for details.

The national program staff contributed to this issue with an article entitled: “[The Dental Pipeline Program: The National Program Office Perspective](#).”<sup>11</sup>

The results reported below are from this special supplement.

### Community-Based Clinical Education

- **All 15 dental schools increased the length of time that senior students spent in community-based rotations.** Almost all senior students enrolled in the schools participated in the senior rotations. A few whom the faculty judged to be unprepared did not participate. The increase went from an average of 16 days (in a range from 0 to 40) at the beginning of the program (2002–03 academic year) to an average of 39 days (in a range from 18 to 60) four years later (2006–07). Four schools achieved the program goal of senior students on average spending 60 days in community rotations.
- **The number of community facilities that had agreements with one or more participating schools for community-based rotations increased from 204 at the start of the program to 344 four years later, a 69 percent increase.** The number of rural facilities increased from 60 to 98 (an increase of 63%).
- **The average number of community sites per school increased from 9.5 to 14.5 for the private schools and from 16.3 to 28.2 for the public schools.** Sites included federally qualified health centers, other community clinics, school-owned or school-managed clinics, community hospitals, and Veterans Administration or other military facilities.
- **A majority (58%) of the patients served whose race/ethnicity was known (93%) were from underserved minority groups:**

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<sup>9</sup> Davidson PL, Nakazono TT, Afifi A, and Gutierrez BA. “Methods for Evaluating Change in Community-Based Dental Education.” *Journal of Dental Education*, 73(2): S37–S51, 2009. Available [online](#).

<sup>10</sup> Andersen RM and Davidson PL (eds). “Evaluating the Dental Pipeline Program: Recruiting Minorities and Encouraging Community-Based Dental Education.” *Journal of Dental Education*, 73(2 Suppl.), 2009. Available [online](#).

<sup>11</sup> Bailit HL, Formicola AJ, D’Abreu KC, Bau I, Zamora G, and Stavisky JS. “The Dental Pipeline Program: The National Program Office Perspective.” *Journal of Dental Education*, 73(2 Suppl.): S15–S22, 2009. Available [online](#).

- Blacks accounted for 21 percent.
- Hispanics accounted for 33 percent.
- American Indians accounted for 4 percent
- **Schools where students felt too little time was spent on cultural competence increased the number of community-based rotation days more than schools where students felt the amount of time for cultural competence education was adequate.** No other school-level or student-level factors were significantly associated with a change in the number of rotation days completed by senior students at each school.
- **Five factors predicted a positive impact from participating in community-based rotations, as self-reported by senior dental students:**
  - Location in a state that has at least limited or full Medicaid-covered dental services for low-income people
  - Students perceiving their school as having an environment that is respectful of culture
  - Students planning to spend more time, rather than less, in community-based rotations
  - Students reporting that an interest in service was a component of their decision to apply to dental school
  - Students having a higher score on a professional responsibility scale
- **Most students reported satisfaction with their community-based rotations.** Benefits cited included:
  - Clinical experience with patients
  - Observing dental practice operations and working at a practice pace and with dental auxiliary staff
  - Treating a diverse set of patients, such as low-income patients and patients with special needs
  - Learning about the need for cultural competency in order to treat patients of a different culture
- **Community clinical directors and faculty were generally supportive of the community-based rotations.** They reported that students brought an enthusiasm that had a positive impact on faculty, patients, and the community. Community clinical directors also appreciated the opportunity to be a part of the dental school and the training of dental students.

## Curriculum Revision

- **Students at the RWJF-funded schools were somewhat more likely to report that they perceived themselves as prepared to treat patients from underserved and disadvantaged communities in 2007 (89% of students) compared with 2003 (83% of students).** Students at the California schools funded by the California Endowment had reported a higher level of preparedness at baseline (90% of students), which did not change over the period.

One variable—whether their school promotes acceptance and respect of diverse people—was significantly associated with students being more prepared to treat these patients.

- **When asked how well the dental school curriculum prepares students to understand, interact, and communicate with patients from cultures different from theirs, clinical and academic faculty and administrators were more likely to respond negatively or neutrally than positively.** Students were more likely to respond positively:
  - Clinical faculty and administrators were more likely to respond negatively or neutrally (63%) than positively (37%).
  - Academic faculty and administrators also were more likely to respond negatively or neutrally (55%) than positively (45%), but to a lesser extent.
  - Students were more likely to respond positively (54%) than negatively or neutrally (46%).
- **Evaluators identified two other cross-site trends:**
  - A broadly diverse student body and/or school-clinic patient pool facilitated cultural awareness and sensitivity.
  - Experiential learning, in comparison with didactic (i.e., classroom) learning, is critical to the development of culturally competent communication skills.
- **All of the schools made changes to their curricula to prepare students for their community-based rotations.** The community-based dental education curricula at the *Dental Pipeline* schools tended to have the following characteristics:
  - The most common course category was community dentistry, followed by patient management and communication/cultural competence.
  - Course structure was evenly distributed across three models:
    - Separate, stand-alone course
    - Integration of content into a broader course that included goals specific to community-based dental education

- Integration of content into a broader course that did not include goals specific to community-based dental education
- Faculty members responsible for the community-based dental education curriculum content were most often dentists with a second degree in public health or in a social science, such as psychology.
- The most common primary teaching method was lecture/seminar.
- **The *Dental Pipeline Program* encouraged many schools to acknowledge and fill gaps within their curricula.** The schools:
  - Added new courses
  - Expanded cultural content in existing courses
  - Repositioned classes to prepare students for earlier rotations or community service work
  - Extended the number of course hours devoted to cultural competence classes
- **Faculty members frequently restructured their course outlines and augmented their classes with innovative activities (e.g., role playing) related to increasing their students' cultural competence.**
- **Important facilitators for successful curriculum revision included:**
  - Administrative support—particularly from the dean—for the faculty and time needed for curriculum establishment and ongoing development
  - A school social and cultural environment that is accepting and respectful of culturally and ethnically diverse students and patients. At the more successful sites, embrace of multiculturalism was central to the dental school's or the university's mission
  - At least one faculty member with behavioral or social science expertise to chair the community-based dental education curriculum
- **Barriers to successful curriculum revision included:**
  - Insufficient faculty to carry out faculty-intensive parts of the curriculum (e.g., conducting small group seminars)
  - Pressure from other disciplines for curriculum time
  - Integrating cultural competency across the curriculum (a challenge at some sites)
  - Insufficient support from the dean to make the requisite changes

## Recruitment of Underrepresented Minority and Low-Income Students

- **Between the 2002–03 and the 2006–07 academic years, both applications from and enrollment of underrepresented minority students increased at all 15 *Dental Pipeline* schools:**
  - Applications from underrepresented minority students to the *Dental Pipeline* schools increased by 77 percent, from 1,238 in 2002–03 to 2,191 in 2006–07.
  - The number of underrepresented minority enrolled students increased from 90 to 139 between 2002–03 and 2006–07 (a 54.4% increase), excluding Howard University College of Dentistry and Meharry Medical College, School of Dentistry—two historically Black universities participating in the program.
  - By contrast, during this time period, enrollment of underrepresented minority students in all of the non-*Dental Pipeline* *majority* schools (i.e., not including the minority dental school at the University of Puerto Rico), increased by 16 percent (from 281 to 326 students).
- **Underrepresented minority students as a percentage of the entering class at all *Dental Pipeline* schools (including minority schools Howard and Meharry) increased from 2002–03 to 2006–07:**
  - In 2002–03, underrepresented minority students accounted for 14.9 percent of the entering class. As a percentage of the entering class:
    - Black students increased slightly from 10.5 percent in 2002–03 to 11.2 percent in 2006–07.
    - Hispanic students increased from 3.8 percent in 2002–03 to 6.5 percent in 2006–07.
    - American Indian students increased from 0.6 percent in 2002–03 to 0.7 percent in 2006–07.
- **When the minority schools (Howard and Meharry) were excluded, underrepresented minority students at all other *Dental Pipeline* schools as a percentage of the entering class increased from 7 percent to 10.9 percent:**
  - The proportion of Black students increased from 3.0 percent to 4.1 percent.
  - The proportion of Hispanic students increased from 4.0 percent to 6.8 percent.
  - The proportion of American Indian students remained the same at 0.8 percent.
- **The most common reasons first- and fourth-year students chose their dental school were location and reputation.**

- **The most common recruiting strategies were recruiting at colleges, pre-dental clubs, summer programs, post-baccalaureate programs, and "long pipeline" programs operating in elementary and high schools and clinics.**

(Long pipeline programs are designed to ensure a continuing and adequate supply of underrepresented minority students as dentists. These programs focus on students in grades K–12 and also may include bridge activities that include grades 11 and 12 and the first and second years of college.)

- **The main barriers to underrepresented minority enrollment were the high and rising tuition, higher living costs at schools in major metropolitan areas, higher tuition at private schools, and other financial factors.** Other key barriers included:
  - School location far from the applicant's hometown
  - Lack of adequate recruitment staff and budget
  - Lack of a sufficient pool of qualified underrepresented minority applicants
  - Lack of sufficient role models in applicants' earlier years
  - Reputation—at some schools—of being unwelcoming to minorities, having academic standards that were "too high" or not having a "critical mass" of current underrepresented minority students and faculty to serve as role models and mentors
- **Administrators and faculty did not consider underrepresented minority retention as a problem, although it was a concern at the minority schools.**
- **First- and fourth-year underrepresented minority students reported that their relationships with faculty and with other students were most important in helping them stay and succeed in dental school.** Other positive factors included:
  - For first-year students: mentors, post-baccalaureate programs, and the general school environment
  - For fourth-year students: family and friends, student organizations, and self-motivation
- **According to self-reported data about family income, underrepresented minority and low-income dental students overlapped only somewhat** (but it should be noted that many students do not like to point out that they are from low-income families):
  - Among students coming from families with an annual income of \$50,000 or less, 17 percent were underrepresented minorities.
  - Of all underrepresented minority students surveyed, 32 percent had family incomes of \$50,000 or less.

- **Two characteristics of low-income students may have implications for recruitment:**
  - Post-baccalaureate programs and dental school visits were less important in recruiting low-income, non-underrepresented minority students than in recruiting underrepresented minority students.
  - Role models were a greater influence on low-income, non-underrepresented minority students choosing dentistry than they were for underrepresented minority students.
- **Low-income, non-underrepresented minority students were less likely to expect to serve underserved minorities or disabled patients after graduation than were underrepresented minority students.** This suggested to evaluators that increasing underrepresented minority enrollment is more likely to improve access to oral health services than is increasing low-income student enrollment.

### Practice Plans of Graduating Seniors

- **Between 20 percent and 27 percent of students expected to provide care for underserved patients (as at least 25% of their patient population) when practicing as a dentist, regardless of school type (RWJF-funded, California Endowment-funded, or non-Dental Pipeline schools).** These percentages did not change significantly from 2003 to 2007, suggesting that the *Dental Pipeline Program* had no impact on practice decisions, according to evaluators.

It needs to be mentioned, however, that the original thinking about the *Dental Pipeline Program* never included the idea that students would change their expectations about where to practice, because so much of that decision is based on debt, notes Judy Stavisky, the original RWJF program officer. "Rather, we anticipated that wherever students did end up practicing, they might be more accommodating to low-income patients and perhaps volunteer at those types of clinics where they worked as students." Formicola adds, "Students at some of the dental pipeline schools took a pledge upon entering that they would donate time upon graduation to providing services to underserved populations. University of North Carolina students were the first to take this pledge, which they themselves introduced, and several other schools' students followed.

- **The odds of a student planning to care for 25 percent or more underserved patients when practicing as a dentist were not significantly different at *Dental Pipeline* schools versus non-Dental Pipeline schools.** The odds also did not change significantly within these schools between 2003 and 2007.
- **Financial factors were the major barrier to students providing dental care to underserved patients.** These included:
  - High educational debt

- Low compensation at community clinics
- Low reimbursement from public insurance programs such as Medicaid
- **Students' practice intentions post-graduation differed according to racial/ethnic status and income level:**
  - About one-half of both low- and high-income underrepresented minority students plan to serve at least 25 percent minority patients post-graduation.
  - Among students not in underrepresented minority groups, 28 percent of low-income students and 17 percent of high-income students plan to serve at least 25 percent minority patients.

### Award for Contributions to Dental Education

- **The ADEAGies Foundation named RWJF as a winner of the 2009 William J. Gies Award for Vision, Innovation, and Achievement for helping address the critical shortage of dental care for underserved populations.** The Gies award honors individuals and organizations that exemplify dedication to the highest standards of vision, innovation and achievement in global oral health and dental education, research and leadership. The ADEAGies Foundation presented the award at the American Dental Education Association Annual Session on March 14, 2009.

### Communications Results

The national program staff, evaluators, and staff from *Dental Pipeline* schools produced a number of articles and presentations and a website about the *Dental Pipeline Program*.

#### Articles

- National program staff and project staff from selected schools published 23 articles about the *Dental Pipeline Program* in the *Journal of Dental Education*, the *Journal of the American Dental Association* and *Community Voices: Healthcare for the Underserved*.
- A special supplement to the *Journal of Dental Education* (2009) entitled “Evaluating the Dental Pipeline Program: Recruiting Minorities and Encouraging Community-Based Dental Education,” includes 29 articles written by program evaluators, national program staff, and staff from the grantee schools.
  - The articles cover program background, evaluation methodology, and evaluation findings, as well as case studies of all projects except for the shortened Temple University project. The supplement is available [online](#).
- The evaluators published seven other articles in the *Journal of Dental Education* and one article in *Special Care Dentist*.

## **Presentations**

- National program staff, staff from the grantee schools, and evaluators made presentations about the *Dental Pipeline Program* at national meetings, such as the annual meetings of the American Dental Education Association, the Pan European International Association for Dental Research, and the American Public Health Association.

## **Website**

- National program office staff also developed a program [website](#) that includes program background and descriptions of the sites, news items, links to related resources, and other information.

## **KEY SITE RESULTS: ROUND 1**

Evaluators of the *Dental Pipeline Program* also reported results from individual Round 1 schools in case studies included in the special supplement to the *Journal of Dental Education*, published in February 2009 (available [online](#)). See the [Bibliography](#) for details. Project directors at the individual schools reported key site results in reports to RWJF and in interviews.

Key site results for four schools are included in this section:

- Meharry Medical College, School of Dentistry
- Ohio State University College of Dentistry
- University of Connecticut School of Dental Medicine
- University of Illinois at Chicago College of Dentistry

Results for the other seven RWJF-funded schools are included in [Appendix 7](#).

## **Community-Based Clinical Education**

### ***Meharry Medical College School of Dentistry***

- **Meharry Medical College increased its community outreach by increasing the number of rotation days and community facilities accepting students:**
  - Community rotation days increased from 13 in 2002–03 to 60 in 2006–07.
  - The number of community facilities increased from five to nine during the same time period. Community sites include a children's dental clinic, a rural health clinic and a clinic serving a patient population that is medically compromised and developmentally and physically disabled.

Faculty feedback about student performance and an increase in students' "speed, productivity and confidence" indicated that the external rotations were successful, according to a report Meharry staff submitted to RWJF.

### **Ohio State University College of Dentistry**

- **Ohio State University's Dental Pipeline Program** (called the OHIO Project) increased the number of community facilities from 10 (four rural and six urban sites) in 2003 to 46 (17 rural and 29 urban sites) in 2007. The project increased the average number of days that students provided care to underserved populations from five in 2003 to 58 in 2007.
- **According to Project Director Canise Bean, DMD, MPH, the most important results of the OHIO Project are:**
  - "It instills and enhances a sense of social responsibility in students.
  - "It exposes students to a variety of diverse populations, promoting growth and learning.
  - "It provides services to many Ohioans who otherwise would not receive care.
  - "It influences the evolution of students' views over the four years from believing, in their first year, that issues of oral health care access are very simple to a much clearer appreciation of the need when they see it out in the community in their fourth year."

*Leah Tate, DDS, an African-American graduate of Ohio State University College of Dentistry, is caring for patients in a public health clinic. Read more.*

Read more about Canise Bean and the OHIO Project in the [Grantee Story](#).

### **University of Connecticut School of Dental Medicine**

- **The University of Connecticut was well positioned to impact the short-term oral health status of its surrounding communities by expanding the delivery of community-based and culturally competent dental care:**
  - The number of days in core community rotations increased from 27 in 2002–03 to 42 in 2006–07, and the number of external sites increased from two to eight over the same time period.
- **The community-based dental education was fully integrated into the dental curriculum.** "Students love it and faculty have embraced it as adding value to the clinical academic program," according to a 2008 report to RWJF.

### **University of Illinois at Chicago College of Dentistry**

- **The University of Illinois at Chicago College of Dentistry implemented a well-conceived clinical rotation program, beginning with initiation experiences in**

year one and culminating in a 60-day comprehensive program of varied community rotations in the fourth year.

- **As of 2006–07, all fourth-year students spend 60 days in extramural rotations at several of 16 community sites in Chicago and other areas of Illinois.** The sites include public health clinics, community health centers, schools and hospitals. Rotations at a site in Colorado and in Guatemala also were available. Students spent no time at community sites at the start of the *Dental Pipeline Program* in 2002–03.
- **During the 2006–07 academic year, senior students provided care for 3,008 children and 3,464 adults (a total of 6,472 patients).** They performed more than 13,163 procedures.

*"It opened my eyes to what things are like for the underserved. I am passionate about preventative oral health care with children. Ninety percent of emergencies are preventable. It made me want to educate parents and children on preventative care."*

*—University of Illinois at Chicago graduate  
Gauri Goyal, DDS*

## Curriculum Revision

### **Meharry Medical College School of Dentistry**

- **Innovations in cultural competence were integrated into the dental school curriculum, including:**
  - Courses in the first three years, some with community experiences included, that prepare students for community-based rotations in the fourth year:
    - "Introduction to Practice Management"
    - "Introduction to Community-Based Education"
    - "Cultural Competency in Health Care"
    - "Community-Based Dental Health II"
  - Diversity Day, an educational program that brings together all the students who come from different cultures, allowing students, faculty and staff to appreciate the various cultures in the school. This event grew each year.

### **Ohio State University College of Dentistry**

- **Ohio State University had planned curriculum revisions prior to the initiation of the OHIO Project and put those into effect under the program.** Major changes included two new courses, scheduling changes, and additions to existing courses:
  - The new "Early Clinical Experience" course links classroom teaching with community experience for first-year students. The goal of the course is to help students become clinically independent early in their dental education so that they

will be equipped to take full advantage of the extramural rotations in their fourth year.

- Two courses, "Merging of the Behavioral Factors in Dentistry" and "History and Epidemiology of Dentistry," were merged into "Early Clinical Experience."
- A new "Cultural Competency" course was established to develop students' understanding of the behavioral and psychological aspects of dental care and clinical skills for diagnosing and managing oral health problems for a diverse set of patients.
- The schedule for all four years was changed to reserve Monday through Thursday for clinical rotations and Friday for didactic learning.

The faculty designed and integrated materials on access to care, communication skills, cultural competence, and diversity into their existing courses.

*"With my own practice I will treat patients who can afford this and also reach out to those in need in the community. My business plan is to do private practice three to four days each week and one to two days of community outreach, in an environment where everything is the same for all patients."*

*—Ohio State University Graduate Neal Patel, DDS*

### **University of Connecticut School of Dental Medicine**

- **New courses included the "Standardized Patient-Instructor Program" and courses in dental health policy and cultural sensitivity, as well as a "Community Health Clinic Rotation Orientation" session.**

The "Standardized Patient–Instructor Program" of half-day sessions over the junior and senior years uses community residents in simulated patient situations to develop and assess students' patient communication skills, particularly focusing on cross-cultural encounters. The sessions improve students' attitudes toward diversity, according to a 2008 report on the program published in the *Journal of Dental Education*.<sup>12</sup>

The "Community Health Clinic Rotation Orientation" session is a one-hour introduction to help prepare students for the community rotations.

### **University of Illinois at Chicago College of Dentistry**

- **The University of Illinois at Chicago revised its curriculum through new courses, restructuring it to prepare students to achieve cultural competence earlier in their dental education. The revised curriculum offers students earlier**

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<sup>12</sup> Wagner J, Arteaga S, D'Ambrosio J, et al. "Dental Students' Attitudes Toward Treating Diverse Patients: Effects of a Cross-Cultural Patient-Instructor Program." *Journal of Dental Education*, 72(10): 1128–1134, 2008. Available [online](#).

**experiences in the community and cultural competence for faculty members, community partners, and staff.** Major changes included two new courses:

- "Comprehensive Care," which increased content on public health dentistry, behavioral science, communication skills, ethics, service learning, and cultural competence
- "Extramural Clinical Experience," which gives fourth-year students the opportunity to spend the summer and each semester providing dental care to diverse patients with community-based faculty as mentors. Other parts of the curriculum that prepare students for the community-based extramural rotations are:
  - A first-year "Community-Based Education" course prior to visits to local elementary schools in underserved communities in which students provide oral health education to the children
  - Visits in the second year by students to community dental clinics and community organizations to investigate community resources
  - A third-year lecture course, "Dental Public Health"
- **The University of Illinois at Chicago "developed and implemented a curriculum that is patient-driven, student-centered, comprehensively delivered, criterion referenced, competency-based and community-focused," according to a report staff submitted to RWJF.** The dental school merged clinical education and service learning to train dentists who can practice in many settings.

## **Recruitment of Underrepresented Minority and Low-Income Students**

### ***Meharry Medical College School of Dentistry***

- **Meharry Medical College developed an aggressive outreach program to increase enrollment of Hispanic and Native American students in its dental program.** This included establishing partnerships with undergraduate schools that had large minority enrollments, such as the University of California, Los Angeles; the University of New Mexico; and universities in Puerto Rico.

“As an Historically Black College, recruitment of African-American students was not a challenge; the challenge was convincing Native American and Hispanic students to come,” said Project Director Cherae Farmer-Dixon, DDS, MSPH

- **The number of underrepresented minority applicants and enrollees increased from 282 applicants and 45 enrollees in 2002–03 to 490 underrepresented minority applicants (a 74% increase) and 52 enrollees (a 16% increase) in 2006–07.** This included more Hispanic and Native American dental students each year.

### **Ohio State University College of Dentistry**

- **Between 2002–03 and 2006–07, the number of underrepresented minority applicants to Ohio State University College of Dentistry increased 67 percent, from 39 to 65.** However, a large increase in underrepresented minority applicants—to 95—occurred in 2003–04 and then steadily decreased to the 65 in 2006–07.
- **The number of underrepresented minority enrollees at Ohio State University increased from six in 2002–03 to eight in 2006–07, with three or four enrollees in each of the three intervening years.** An unwritten policy at the College of Dentistry holds that 75 percent of each incoming class must be filled by Ohio residents. Since a majority of underrepresented minority applicants are from out of state, they must compete—with out-of-state non-underrepresented minorities and with one another—for the small number of places remaining.

In addition, compared with other dental schools, Ohio State University has less financial aid available and makes aid decisions later in the admissions cycle.

### **University of Connecticut School of Dental Medicine**

- **The University of Connecticut achieved a considerable increase in underrepresented minority applicants and enrollees during the program.** Recruitment efforts included establishing an Office of Community Outreach, a Pipeline Health Professions Summer Institute and a post-baccalaureate program.
- **The University of Connecticut dental class of 2012 (i.e., students who entered in fall 2008) included three Black and four Hispanic students, comprising 17.5 percent of the class of 40 students, close to the project's target of 20 percent.**
- **Changes in the admission process have been the most important result, according to Project Director Cynthia Hodge, DMD, MPH, MPA:** "The dean of admissions has been proactive in changing the way we review applications and select candidates. This will be the one lasting result of the *Dental Pipeline Program*. This is the 'whole life review' in which, while the numbers are critically important, we do look at other factors, such as life experience and other expertise (like being a hygienist or EMT)."

### **University of Illinois at Chicago College of Dentistry**

- **The University of Illinois completed a comprehensive restructuring of its recruitment program for underrepresented minority/low-income students.** This included:

- Hiring a new associate dean for the Office of Student and Diversity Affairs and an associate dean for prevention and public health sciences

*Esther Lopez, DDS, a Hispanic graduate of the University of Illinois College of Dentistry, treats mostly patients on public aid. Read more.*

- Establishing an Ambassador Program in which students received scholarships in

return for distributing information about oral health and careers in dentistry at the high schools from which they graduated

- Strengthening partnerships with state colleges in Illinois with a history of serving underrepresented minority/low-income students
- Restructuring the admission process to expand the criteria for selection and to admit more out-of-state students
- **Between academic years 2002–2003 and 2006–2007, the number of underrepresented minority applicants increased steadily from 50 to 163, and the number of underrepresented minority enrollees increased from four in 2002–03 to 13 in 2005–06.**
- **Enrollment of underrepresented minority dental students has been maintained at 20 percent of all students for 2006, 2007 and 2008, up from 6 percent at the beginning of the program.** Project staff believes this has resulted mainly from the post-baccalaureate program the College of Dentistry offers in conjunction with the College of Medicine. This program allows up to eight students who have been accepted into the university's dental school to matriculate after successful completion of the baccalaureate program.
- **Underrepresented minority faculty increased from five in 2002 to 19 in 2008.** According to Project Director Caswell Evans Jr., DDS, MPH, "There is also now a critical mass of minority faculty, which helps with minority students."

## CONCLUSIONS: ROUND 1

Evaluators of Round 1 of the *Dental Pipeline Program* offered conclusions about the Round 1 results in a special supplement to the *Journal of Dental Education*, published in February 2009. The supplement is available [online](#). See the [Bibliography](#) for details.

### Community-Based Clinical Education

- “While all schools implemented a change to enlarge the scope of community-based clinical teaching, the challenge goal of 60 days within the senior year was not achieved by most schools. For some schools, the time was too short and the need to garner faculty buy-in took too long for such a remarkable adjustment to the curriculum. Nonetheless, the resulting ... improvement of ... almost five weeks of the senior program over the initiation of the demonstration is a remarkable feat in dental education.”
- “Two broad philosophies evolved across the Pipeline Programs in implementing the extramural clinical rotation programs.... Some schools selected a small number of affiliated program sites with most or all students rotating to each site; other schools generated multiple options, with urban, rural, out-of-state and even international sites that would appeal to students of varying interests.”

- “Senior dental student service is a clear way for dental schools to participate in further increasing the access to care for the underserved who cannot utilize the dental school clinics attached to the dental school.”

### **Curriculum Revision**

- “Virtually all [sites] leveraged the opportunity of the Pipeline initiative to enhance their CBDE [community-based dental education] curricula.... Schools that had well-developed CBDE content at baseline used the opportunity to develop new content modules and move to more interactive learning modes of content delivery. Others were able to create needed CBDE course content and successfully lobby for corresponding curriculum time.”
- “The increased awareness of cultural issues in patient care generated by the Pipeline program exposed a need to improve the cultural competency of faculty that was evident across all schools.”
- “The ... findings suggest that accreditation standards for U.S. dental schools should specifically address adequate curricular infrastructure for culturally sensitive patient care competencies. Opportunities for experiential learning in CBDE as well as for processing the experiences through reflective activities should be provided. Integration of CBDE content into mainstream clinical and basic science tracts should be encouraged, and competency assessment in communication skills and cultural awareness/sensitivity should be formalized.”

### **Recruitment of Underrepresented Minority and Low-Income Students**

- “There was general agreement among faculty members and administrators of the Pipeline schools that the underrepresented minority recruitment programs supported by the Pipeline program will continue after it concludes. This is because of strong administrative support and faculty buy-in, although the degree of that buy-in varies considerably across the Pipeline schools. The likelihood of sustainability is enhanced because the Pipeline program has been woven into the overall program fabric of many of the schools....

“The main problem for sustainability is financial. Some scholarships are being eliminated and recruitment programs are being cut back due to budgetary restrictions.”

## **THE PROGRAM: ROUND 2**

### **Program Design**

In April 2007, the RWJF Board of Trustees authorized renewal funding of up to \$4 million for a second round of the *Dental Pipeline Program* for 38 months from July 2007 through August 2010.

The Center for Family and Community Medicine at Columbia University Medical Center continued to serve as the national program office for Round 2, with Allan J. Formicola and Howard L. Bailit as co-directors and Raquel Munoz as program coordinator and ultimately deputy director. Deputy Director Kim D'Abreu became associate director of the Center for Education Policy and Research at the American Dental Education Association in June 2009. No new deputy director was hired after that.

A new, nine-member national advisory committee provided guidance during Round 2. The committee included four members of the Round 1 National Advisory Committee. See [Appendix 8](#) for a list of Round 2 National Advisory Committee members.

The second round of the *Dental Pipeline Program* built on the findings of the initial, Round 1, program. The goal of Round 2 was to disseminate the best practices discovered in Round 1 and replicate them in additional schools. In Round 2 RWJF provided grants to dental schools to either:

- Establish more comprehensive programs to recruit more underrepresented minority or low-income students, OR
- Provide senior students with service-learning experiences in patient-centered community settings providing care to underserved patients.

Round 2 was designed to provide schools already committed to these programs with the resources and technical support to make rapid advancements.

### **Building on the Lessons of Round 1**

In March 2008, RWJF announced grants to eight dental schools of up to \$200,000 each for 27 months.

Four schools focused on recruitment of underrepresented minority or low-income students:

- A.T. Still University, [Arizona School of Dentistry & Oral Health](#)
- Creighton University, [School of Dentistry](#)
- Texas A&M Health Science Center, [Baylor College of Dentistry](#)
- Virginia Commonwealth University, [School of Dentistry](#)

Four schools focused on community-based education:

- Medical College of Georgia [School of Dentistry](#)<sup>13</sup>

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<sup>13</sup> Medical College of Georgia School of Dentistry is now Georgia Health Sciences University College of Dental Medicine.

- University of Florida, [College of Dentistry](#)
- University of Maryland, Baltimore, [College of Dental Surgery](#)
- University of Medicine and Dentistry of New Jersey, [New Jersey Dental School](#)

See [Appendix 9](#) for grant details.

These schools were expected to “replicate best practices learned from the experiences of the 15 dental schools funded during the first round of grants,” according to RWJF Program Officer Denise Davis, DrPH, MPA.

During the same period, the California Endowment provided support for the five California dental schools to continue to participate in the *Dental Pipeline Program*. These included the four schools supported in Round 1 by the California Endowment as well as the University of California, San Francisco, which RWJF funded in Round 1.

### **Institutionalizing the *Dental Pipeline Program***

Round 2 also included two contracts between the national program office and national organizations to help institutionalize, within dental education and practice, initiatives to facilitate minority student recruitment created through the *Dental Pipeline Program*. “Long-term,” said Formicola, “we were going out of business as the national program office and we had to make this live on.”

The two contracts were:

- With the [American Dental Education Association](#) to:
  - Train admissions experts to conduct workshops on “whole file” review of applicants for admission to dental school. (Whole file review considers both quantitative measures, such as Dental Admission Test scores and grade point averages, and qualitative factors such as motivation, life experiences, etc.)
  - Develop an action plan to enforce diversity-related accreditation standards
- With the [National Dental Association](#) to collaborate with the Hispanic Dental Association and the Society of American Indian Dentists to create and test a mentoring program with three Round 2 schools.

### **National Program Office Activities**

National program office staff assisted Round 2 schools and furthered the goals of the *Dental Pipeline Program* by:

- Monitoring school progress and providing technical assistance through annual meetings, site visits, consultations, and conference calls. Staff teamed Round 2

grantees with project directors from Round 1 “so they would have somebody to go to, to ask questions,” said Formicola.

National program staff also held training sessions for the Round 2 grantees featuring project directors from the Round 1 schools who shared their experiences and networked with the Round 2 grantees. “This networking was a very important part of the information-transferring,” said Bailit. Round 2 schools also had access to operating manuals developed by many of the Round 1 schools.

- Disseminating findings, best practices, and resources to dental schools, stakeholder organizations, and the general public through:
  - The program website: [www.dentalpipeline.org](http://www.dentalpipeline.org)
  - Dialogue with national dental organizations
  - Targeting deans, senior administration, faculty, and staff at each U.S. dental school through annual program meetings and special sessions of the American Dental Education Association and Council of Deans
  - Targeting pre-dental students, recent college graduates, and advisers who work with students interested in the health professions (pre-health advisers) through professional organizations, including minority dental associations

## OVERALL PROGRAM RESULTS: ROUND 2

Formicola and Bailit provided overall program results for Round 2 in a report to RWJF.

### Overall School Results

- **The key elements of the recruitment programs for underrepresented minority and low-income students at the four schools that focused on recruitment were:**
  - Summer enrichment and/or post-baccalaureate programs
  - Collaborations within the school’s academic health center and with colleges and universities in the school’s geographic region
  - Strong relationship building with pre-health advisers at feeder colleges and universities
  - Formal student mentoring programs in collaboration with minority dental organizations
  - Admissions committee use of the whole file approach to reviewing applicants
- **The four schools focused on community-based dental education implemented comprehensive strategies and operational plans to significantly increase the average number of days that senior dental students spend providing care to**

**underserved patients in community settings.** Key elements of their community-based programs included:

- Pre- and post-rotation student seminars that incorporated students' written reflections on their community experience
  - Effective management reporting systems
  - Course credit awarded for clinical procedures provided at community sites
  - Rotations of two weeks or more at each site
- **The Round 2 schools are committed to continuing the programs that they developed and strengthened while participating in the *Dental Pipeline Program*.** See [Appendix 10](#) for examples of sustainability at the Round 2 schools.

### Strengthening Admissions

Results of the work with the American Dental Education Association on admissions of underrepresented minority and low-income students include:

- **Admissions officers from 10 dental schools<sup>14</sup> participated in a two-day train-the-trainer workshop held at the American Dental Education Association in the spring of 2008.** The workshop prepared trainers to assist admissions committees seeking greater student diversity.
- **The 10 admissions officers then conducted pilot summer admissions committee workshops at five schools.<sup>15</sup>**
- **An evaluation conducted by Shelia Price, DDS, EdD,<sup>16</sup> of both the Train-the-Trainer workshops and admissions committee workshops held by the association found:**
  - Overall excellent ratings for the workshops. Data were collected via pre- and post-workshop surveys, online evaluation of the programs, and interviews with five deans/directors of admissions.
  - All of the deans/directors interviewed planned to implement the strategies presented in the workshops.

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<sup>14</sup> The participating schools were: Baylor, Boston, Florida, Kentucky, Minnesota, Southern Illinois, Temple, University of California at San Francisco, University of Medicine and Dentistry of New Jersey, and Virginia Commonwealth.

<sup>15</sup> The pilot workshop schools were: Detroit–Mercy, Iowa, Kentucky, Marquette, and University of Texas at San Antonio.

<sup>16</sup> Price, Associate Dean for Admissions, Recruitment, and Access at the School of Dentistry at West Virginia University, was a Round 1 project director and a member of the Round 2 national advisory committee.

## Establishing Accreditation Standards

Results of the American Dental Education Association’s effort to enforce diversity-related accreditation standards include:

- **The American Dental Association convened a committee to review accreditation standards related to student diversity.** Subsequently, the association’s board recommended to the Commission on Dental Accreditation that a new standard for diversity be included in pre-doctoral standards.
- **The Commission on Dental Accreditation approved four new or stronger pre-doctoral standards that together require:**
  - **Diversity in admission of students, and hiring of staff and faculty**
  - **Cultural competence in treating diverse patients**
  - **Clinical experiences in community-based settings**

Bailit and Formicola consider this “an incredible outcome” and noted the importance of the two new standards on diversity and service learning.

“The diversity standard says that the dental schools *must*—and that is the important word—have policies and practices to achieve appropriate levels of diversity among students, faculty, and staff, and talks about the importance of diversity in school structure and curriculum and in the institutional climate,” said Formicola.

“The service learning standard says that the dental school programs *must* make available opportunities to encourage students to engage in service learning experiences or community-based learning experiences,” he said.

## Creating and Testing a Mentoring Program

The collaboration of the National Dental Association, the Hispanic Dental Association, and the Society of American Indian Dentists to create and test a mentoring program had the following results:

- **The organizations established a Dental Mentorship Council that developed the mentoring program and selected three sites for a pilot test:**
  - Arizona School of Dentistry & Oral Health partnered with the local chapters of each organization.
  - Virginia Commonwealth University Dental School partnered with local chapters of the National Dental Association and the Hispanic Dental Association.
  - Baylor School of Dentistry partnered with local chapters of the National Dental Association and the Hispanic Dental Association.

Each partnership developed recruitment activities and connections with college pre-health advisers and potential mentors and mentees.

- **The Dental Mentorship Council held a meeting in October 2009 and created a Dental Mentorship Council Mentoring Manual that describes the role of the mentor and offers advice on establishing successful mentor–mentee relationships.**

## **Studying the Impact of Community-Based Education on Dental School Finances**

Some dental school deans had voiced a concern that having senior students spend 60 or more days providing dental care in a community setting, rather than in the dental school clinic, would result in major losses in clinical income for the schools.

Under a separate RWJF grant,<sup>17</sup> program Co-Director Bailit examined the financial impact of community-based dental education on dental school finances. Bailit and colleagues compared senior clinic<sup>18</sup> revenues and expenses in four schools with extensive community-based education programs (50 or more days per year) and four schools with limited community-based education programs (10 or fewer days per year). They conducted a financial survey of each school and worked with three schools to develop case histories.

### **Findings**

Bailit and colleagues reported findings in a series of articles that comprise a special 2011 [supplement](#)<sup>19</sup> of the *Journal of Dental Education* entitled “Assessing the Impact of Community-Based Education on Dental School Finances.” Key findings include:

- **Senior clinics in all of the schools have higher expenses than the revenues collected:**
  - The average loss is \$28,750 per student and \$37,961 per dental chair.
  - Revenues collected for senior clinics cover only 35.4 percent of per-chair operating expenses.
  - For a senior class of 100 students using 100 dental chairs, the average school loses \$3.7 million.

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<sup>17</sup> Grant ID# 65299 to Hospital for Special Care (New Britain, Conn.) for \$300,000 between December 2008 and October 2011.

<sup>18</sup> Senior clinics are clinics at dental schools staffed by senior year dental students.

<sup>19</sup> Bailit H and McGowan T (eds). “Assessing the Impact of Community-Based Education on Dental School Finances.” *Journal of Dental Education*, 75 (10 Suppl.): 2011. Abstracts available [online](#). Full text requires subscription or fee.

- **The schools with extensive community-based education programs (i.e., 50 or more days per senior year) had substantially lower per-senior-student clinic losses than did the schools with limited programs (i.e., 10 or fewer days).** This is because the schools with extensive community-based education programs have fewer dental chairs per student and a larger class size, and they generate more tuition revenues.
- **Another “huge positive dimension” associated with moving into the community, according to Bailit, is that “it builds community support for the school’s activities. They get politicians, businesses, etc., to support their efforts and they are not as isolated as they were.”**
- **“The bottom line is that it is a big gain financially for dental schools to go into the community,” concluded Bailit.** “Now, not only are existing schools moving into the community as fast as they can, but almost all new schools have a totally different, community-based strategy for educating senior students and residents.”

## Communications Results

National program staff coordinated the development of a special [supplement](#)<sup>20</sup> to the *Journal of Dental Education* entitled “Successful Community-Based Dental Education Programs and Underrepresented Minority Dental Student Recruitment and Enrollment Programs. A Report and Guide from the Pipeline, Profession, and Practice: Community-Based Dental Education Program.” Published in October 2010, the supplement is a comprehensive operational manual that outlines strategies for developing underrepresented minority recruitment and community-based dental education programs. See the [Bibliography](#) for a list of articles in the supplement.

As noted above, the *Journal of Dental Education* published a series of articles by Bailit and others in a special supplement entitled “Assessing the Impact of Community-Based Education on Dental School Finances,” in 2011.

Another key communications activity was an [article](#)<sup>21</sup> by Formicola and Bailit on the history, status, and future direction of community-based dental education published in the special 75th anniversary issue of the *Journal of Dental Education* in 2012.

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<sup>20</sup> Bailit HL and Formicola AJ, eds. “Successful Community-Based Dental Education Programs and Underrepresented Minority Dental Student Recruitment and Enrollment Programs. A Report and Guide from the Pipeline, Profession, and Practice: Community-Based Dental Education Program.” Supplement, *Journal of Dental Education*, 74(10), 2010. Available [online](#).

<sup>21</sup> Formicola AJ and Bailit HL. “Community-Based Dental Education: History, Current Status, and Future.” *Journal of Dental Education*, 76(1): 98–106, 2012. Abstract available [online](#).

## KEY SITE RESULTS: ROUND 2

Project directors at the individual schools reported key site results in reports to RWJF and in interviews. Key site results for two schools are included in this section:

- Texas A&M Health Science Center, Baylor College of Dentistry
- Medical College of Georgia School of Dentistry

Results for the other six RWJF-funded Round 2 schools are included in [Appendix 11](#).

### Baylor College of Dentistry

The overall goal for Baylor's *Dental Pipeline* project was to increase the recruitment of underrepresented minority and low-income students to dentistry by strengthening Baylor's own pipeline program [Bridge to Dentistry](#). During Baylor's participation in the *Dental Pipeline Program*, the Bridge to Dentistry program:

- **Increased awareness of dental health and careers in dentistry of students at elementary and secondary schools.** Accomplishments included:
  - Establishment of Future Dentist Clubs in four elementary schools and one junior high school as well as a city-wide high school club (for 11 schools). In 2009, 127 students joined these clubs.
  - Participation of 5,325 elementary school students in 2008 and 2009 in dental hygiene and career awareness activities.
  - Field trips to Baylor by 1,472 junior high and high school students between 2008 and 2010. Students toured the college, met dental students, and learned about dental careers and specialty areas.
  - Participation by 68 rising 10th and 11th graders in a Baylor Summer Pre-Dental Enrichment Program in 2008 and 2009. Students investigated a dental issue and presented findings to their class, discussed dental career paths, and more.
- **Improved the college acceptance potential of rising high school seniors interested in the health professions and dentistry.**
  - 38 rising high school seniors participated in a five-week Summer Pre-Dental Enrichment Program in 2008 and 2009. The program included courses on SAT preparation, preclinical dentistry, and investigating dentistry. Students visited private dental practices, public dental clinics, and colleges and universities.
  - By the end of the summer, students had increased their SAT-related skills and were more knowledgeable about dentistry and college entrance. All 35 of the students who subsequently applied to college were accepted.

- **Enhanced the academic background and nurtured the interest in dentistry of high school graduates through a summer program.** Prior to the RWJF funding, Baylor had summer programs for 9th, 10th, and 11th graders but none for high school seniors who had just graduated.
  - During a six-week Pre-College Summer Pre-Dental Enrichment Program for high school graduates in 2008 and 2009, 21 students took two courses at a two-year college to acclimate to college, observed Baylor dental clinics, and participated in dental courses. Most students entered college with a continued interest in dentistry.
- **Provided academic enrichment for college graduates in a one-year post-baccalaureate program.**
  - 26 of the 32 students who participated in this program in 2009 and 2010 were accepted to Baylor College of Dentistry.
- **Increased the dental school admissions competitiveness of college students interested in dentistry.**
  - At the eight-week Summer Pre-Dental Enrichment Program for College Students in 2008 and 2009, 45 students took six courses (ranging from Introduction to the Human Body to Dental Admissions Test Preparation), participated in workshops on the application process, and observed dental procedures on campus, in private practices, and in public dental clinics.
  - By June 2010, 34 students had applied to dental school and 25 had been accepted. Four students were accepted to Baylor’s Post-Baccalaureate Program.
- **Provided academic support to underrepresented minority and low-income dental students to increase their graduation rates.**
  - Through academic counseling, peer tutoring, an alternative dental curriculum, and other strategies Baylor has been able to graduate at least 90 percent of underrepresented minority and low-income students each year.

In an article<sup>22</sup> published in 2012 in the *Journal of Dental Education*, entitled “Achieving Student Diversity in Dental Schools: A Model That Works,” Ernestine S. Lacy, DDS, MA, the Bridge to Dentistry director and colleagues reported:

- During the 2009–2010 academic year, 35.8 percent of Baylor’s students were underrepresented minorities compared with 12.7 percent of all students in U.S. dental schools.

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<sup>22</sup> Lacy ES, McCann AL, Miller BH, et al. “Achieving Student Diversity in Dental Schools: A Model That Works.” *Journal of Dental Education*, 76(5): 523–533, 2012. Abstract available [online](#).

- Lacy noted that participating in the *Dental Pipeline Program* enabled Baylor to make Bridge to Dentistry more comprehensive by adding the Future Dentist Club and the Summer Pre-Dental Enrichment Program for high school graduates, and to offer Bridge to Dentistry to more participants.

“Baylor is an outstanding school in diversity,” noted Formicola. “They have a program that is so comprehensive that I don’t think there is any other school in the country that can match that. And they have now institutionalized their programs.”

For more information on the *Dental Pipeline* project at Baylor, read the [Site Story](#).

### Medical College of Georgia School of Dentistry

The goal of the Georgia Dental Community Service Initiative, the Medical College of Georgia’s *Dental Pipeline* project, was to “increase the amount of time that students are at community sites and the number of sites that they can participate in and also to make changes to our curriculum to be more supportive of community-based education,” said Project Director Carole M. Hanes, DMD.

Key results included:

- **The length of time that senior students spend off-campus providing dental care in the community increased from two to six weeks.** Project leaders addressed faculty concerns about students’ ability to meet graduation requirements and retain school-structured standards through strategies such as:
  - Meetings in which dental school faculty and community clinic faculty agreed on standards for student work
  - Site visits to community dental clinics by faculty members
  - Student feedback
  - Evidence of work completed off-campus through logs verified by community faculty
- **The number of community rotation sites increased from nine to 16.** This allowed students to gain exposure to providing dental care in rural areas and build their skills, and helped to address the need for dental care across the state.
- **The School of Dentistry faculty agreed that students would receive credit for all procedures completed during community rotations.** One-day sessions led by the associate dean for patient services to establish procedural standards with the community-based faculty in off-campus clinics, were a major factor in this decision. During these sessions, department chairs presented their expectations for students and discussed student experiences with community-based faculty.

- **The previous community outreach curriculum was revised from one course for seniors to a four-year curriculum, with one course for each year.**
- **The overall number of patients who have received dental care at the community sites has increased. Dental students saw 4,902 patients during the 2008–2009 and 5,259 patients in 2009–2010.** Other sites have requested to participate in the program.
- **The number of students pursuing careers and volunteering in dental public health clinics has increased.**

Bailit notes that Dean Connie L. Drisko, DDS, and her colleagues “have not only greatly increased the amount of time that the students spend in the community, but also built an incredible network of relationships with community clinics and providers.” They have also gained the support of the Georgia Dental Association and overcome great resistance within the faculty. “There is now a solid management infrastructure there, which is really important since a distributed educational system requires a different set of management skills from a centralized system.”

For more information on the *Dental Pipeline* project at Medical College of Georgia School of Dentistry, read the [Site Story](#).

## LESSONS LEARNED

### Overall Program Lessons

1. **Understand the issues that dental schools face when constructing an intervention.** For example, expanding community-based dental education was attractive to some schools feeling pressure to accept more students, due to a perceived need to graduate more dentists but lacking funds to build additional operatories (working spaces for dental students) to accommodate them. (National Program Staff)
2. **Select some dental schools that already have well-established community-based dental education programs and experience in recruiting underrepresented minority and low-income students that can serve as credible models to convince other schools to participate and to help them succeed.** The participating schools included two dental schools experienced with community-based dental education (Boston University and the University of North Carolina) and two historically Black dental schools (Howard and Meharry). Program staff at these schools used their expertise to assist schools without experience. In particular, the inclusion of Howard and Meharry helped program staff understand the important role of race and ethnicity in recruiting students of color and was a major factor in program accomplishments. (National Program Staff)
3. **Ensure the support and leadership of the deans and other top dental school officials when attempting to effect complex changes in admissions and**

**curriculum.** The most effective schools had the most engaged leadership. (National Program Staff)

4. **Engage project directors who are trusted members of the dental school faculty and well respected by the administration in order to bring about changes in school policies and operations.** At many of the schools, trusted and well-respected project directors were able to overcome faculty and administration resistance to change by using their own strong standing to persuade others to consider policy and operational changes. (National Program Staff)
5. **Encourage communication among staff from the national program office, staff and faculty from the dental schools and external stakeholders (e.g., dental associations)—but particularly among project directors and faculty from different schools—so they can learn from one another.** National program staff encouraged program directors and faculty to interact and built in mechanisms for this through the annual meeting and other project meetings and activities. (National Program Staff)
6. **Maintain the visibility of the program among key individuals and organizations within the dental practice, dental education, and public health communities.** National program staff held personal meetings with key stakeholders to keep them informed about the program, and supportive of it. This contributed to the program's accomplishments. (National Program Staff)
7. **Foster school collaboration through the involvement of an entity such as the American Dental Education Association.** The American Dental Education Association provided forums at its annual meetings for national program staff to disseminate best practices learned from the *Dental Pipeline* experience and to make other dental schools aware of the progress and issues addressed by the *Dental Pipeline* schools. These efforts did not require grant funding. (Deputy Program Director)
8. **Learn as much as you can from a pilot project before taking a program full scale.** At the University of Illinois at Chicago, the dental school staff tried new ideas first on a small scale before introducing them schoolwide. (Project Director, University of Illinois at Chicago)
9. **Actively involve national organizations in major change efforts.** The involvement of national dental organizations such as the American Dental Education Association and the American Dental Association in the *Dental Pipeline Program* provided encouragement to the schools to make difficult changes in their clinical education and recruitment programs. (National Program Staff)
10. **Use small, targeted grant programs to further a large program's goals.** For example, the national program office's Dental Pipeline Connections Supplemental Grant Program helped schools enhance their mentoring efforts. (National Program Staff)

**11. In designing an evaluation of a complex program, it is important to develop a model that can drive the evaluation work.** There were many parts to the *Dental Pipeline Program* in which the 15 schools engaged. The evaluators developed a model to guide the evaluation early in the program. Without such a model, "you will get lost in the forest," said evaluator Ronald Andersen. "The model really helps make sense of what to do with all the data." (Evaluator)

For more lessons about community-based dental education and recruitment of underrepresented minority students, see [Appendix 12](#).

## SIGNIFICANCE TO THE FIELD

After Round 1 program directors of the *Dental Pipeline Program*, in the 2010 supplement to the *Journal of Dental Education*, wrote:

*[The Dental Pipeline Program has] moved dental education forward in two critical areas over a short period of time. Students now have a broader understanding of societal issues, and greater ability to care for the underserved. Likewise, schools have accepted the need to recruit more diverse students and have changed their recruitment and admissions practices to achieve this goal. In sum, the Pipeline program has had an impact on reducing access disparities through changes in dental education.*

Paul Casamassimo, DDS, MS, professor and head of the Section of Pediatric Dentistry at Ohio State University College of Dentistry and the initiator of OSU's Round 1 Pipeline project, discussed what the program did to solve these "serious problems" in dental education:

- Curricula and faculty who reflected past practices rather than emerging knowledge
- Instruction that focused on procedures rather than comprehensive care
- Weak medical–dental connections
- Redundant coursework

He said in an interview: "This program is *essential* to dental education. This is the only thing offered in the last 15 years that is a viable solution."

The Georgia Medical College School of Dentistry's Drisko praised the work of Bailit and Formicola. "They have had a profound impact on dental education. Now we have accreditation standards that require community-based education. They really shifted that whole dynamic. Plus, public health, community health, and epidemiology courses are now going to be tested on the national board exam. Again, it's because of this big curriculum change that has swept across the whole country. Those two have had an awfully big hand in it."

Former RWJF Program Officer Judith Stavisky said: “What is very important is that we have changed the quality of education for all students. The national impact is the increase in minority students applying and being admitted. We hope that other schools will mimic the program. This has elevated dentistry as a profession for minorities.”

## AFTERWARD

The *Dental Pipeline Program* ended and the national program office closed on July 30, 2010.

Several post-program RWJF grants helped to continue the work of the *Dental Pipeline Program*:

- A nine-month grant<sup>23</sup> to the American Dental Education Association (which ended in March 2011) to expand the reach of the admissions committee workshops initiated during Round 2 through:
  - Development of a manual, *Transforming Admissions: A Practical Guide to Fostering Student Diversity in Dental Schools*, available on the Association’s website
  - Presenting the admissions committee workshop to representatives of other health professions
  - Re-convening of the original admissions committee workshop presenters to update the format and enhance it for use with other health professions. The updated presentation is available [online](#).
- A one-year grant<sup>24</sup> to the National Dental Association (which ended December 2011) supported the work of the Dental Mentorship Council (created during the *Dental Pipeline Program*) to increase enrollment of underrepresented minority students for another year. See [Program Results](#).
- An 18-month grant<sup>25</sup> to the University of the Pacific, Arthur A. Dugoni School of Dentistry (ending June 2013) established the [Dental Pipeline National Learning Institute](#). Paul Glassman, DDS, MA, MBA, is project director, working in partnership with the American Dental Education Association. The purpose of the institute is to disseminate best practices from the *Dental Pipeline Program* through:
  - Development of a curriculum

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<sup>23</sup> ID# 67773 for \$55,668

<sup>24</sup> ID# 68329 for \$50,075

<sup>25</sup> ID# 69546 for \$650,000

- Enrollment of 10 dental school/community partnerships in a 12-month series of seminars, webinars, case study discussions, and review of financial, operational, and organizational data for future planning

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**Prepared by: Mary B. Geisz**

Reviewed by: Lori De Milto and Molly McKaughan

Program Officers: Judith Stavisky and Denise Davis

Program Area: Human Capital

Grant ID: DAP

Program Director: Howard L. Bailit (860) 679-5487; [bailit@nso1.uchc.edu](mailto:bailit@nso1.uchc.edu)

Program Director: Allan J. Formicola (212) 304-6418; [ajf3@columbia.edu](mailto:ajf3@columbia.edu)

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## APPENDIX 1

### RWJF Strategy—Oral Health as a Policy and Financing Issue and as a Workforce Issue

#### *Oral Health as a Policy and Financing Issue*

RWJF programs to address policy and financing issues included:

- The \$4.8 million *Dental Services Research Scholars Program* (1982 to 2009), which provided research fellowships to dental faculty to study the financing, organization and delivery of dental health services in the United States.
- The \$8 million *State Action for Oral Health Access* program (2002 to 2006), in which six states tested innovative ways to increase access to oral health services for underserved populations through Medicaid, the State Children's Health Insurance Program (CHIP) and the health care safety net. (See [Program Results](#) and the program's [best practices report](#) for more information.)

#### *Oral Health as a Workforce Issue*

Efforts that linked improved access to dental care for underserved populations with improved or expanded training of dentists and other dental health care professionals included:

- The development and dissemination of training videos to teach dental students, faculty and practitioners how to communicate effectively with a culturally diverse patient population (1994 to 1995). (See [Program Results](#).)
- The Dental Assistant Training Program at the Columbia University School of Dental and Oral Surgery, which provided disadvantaged, minority residents of northern Manhattan with tuition-free training to become qualified dental assistants from 2002 to 2004. (See [Program Results](#).)

## APPENDIX 2

### National Program Staff Activities: Round 1

National program staff activities during Round 1 included:

- Each year, conducted site visits to participating schools (varying from several schools in some years to all schools in others) and hosted multiple telephone calls with each school
- Convened six annual meetings of staff at the 15 sites, dental school deans, evaluators, and others from 2002 to 2007

- Established, and later redesigned, a program website, [www.dentalpipeline.org](http://www.dentalpipeline.org)
- Held a Cultural Competency Forum (January 2003) for staff at the sites, with a video posted on the program website and a CD distributed to each school
- Developed a National/Regional Recruitment Plan to assist schools in coordinating underrepresented minority student recruitment activities on college campuses
- Supplied consultants to selected schools to provide special training and advice in:
  - The logistics of community rotations
  - Financing issues associated with off-site programs
  - Identifying appropriate site
  - Curriculum revision
- Held special meetings and workshops, including:
  - Meetings for grantee school staff (2003 and 2004) and project directors (2005, 2006 and 2007) in conjunction with annual meetings of the American Dental Education Association
  - A symposium to disseminate program outcomes at the 2006 American Dental Education Association Council of Deans Meeting. Deans and associate deans from all U.S. dental schools attend the Deans Meeting.
  - An admissions workshop prepared for Temple University School of Dentistry, and subsequently presented at five other schools (both Pipeline and non-Pipeline) across the country
  - A technical assistance workshop for admissions officers at grantee schools in April 2007
  - A cultural competency workshop (November 2003), to which two representatives from each school were invited
- Established two regional recruitment consortia of five schools each: Northeast Regional Recruitment Collaborative and California Recruitment Committee. The consortia:
  - Worked in their regions on developing recruiting materials, relationships with feeder colleges and post-baccalaureate programs
  - Partnered with regional associations of the National Association of Advisors to the Health Professions to host workshops on dental school admissions and financial aid prior to regional meetings in April 2006. More than 50 advisers from 30 colleges and universities attended.

The Northeast Regional Recruitment Collaborative also participated in a student recruitment conference held by the National Association of Medical Minority Educators at the University of Puerto Rico in April 2007. About 100 students attended.

## APPENDIX 3

### Round 1 National Advisory Committee

**Caswell A. Evans Jr., DDS, MPH (Chair)**

Associate Dean  
Prevention and Public Health Sciences  
University of Illinois College of Dentistry  
Chicago, Ill.

**Charles J. Alexander, PhD**

Associate Vice Provost, Student Diversity  
Director, Academic Advancement Programs  
University of California at Los Angeles  
Los Angeles, Calif.

**Robert M. Anderton, DDS, JD, LLM**

Past President  
American Dental Association  
Carrollton, Texas

**William Dodge, DDS**

Vice Dean  
University of Texas at San Antonio  
San Antonio, Texas

**A. Isabel Garcia, DDS, MPH**

Deputy Director  
National Institute of Dental and Craniofacial  
Research  
Bethesda, Md.

**Ernest L. Garcia Jr., DDS**

Private Practitioner  
President  
Hispanic Dental Association  
Yuba City, Calif.

**George Jenkins, DMD**

Assistant Professor of Clinical Dentistry  
Department of Restorative Dentistry  
Columbia University College of Dental  
Medicine  
New York, N.Y.

**Julia Graham Lear, PhD**

Director  
Center for Health and Health Care in Schools  
George Washington University  
Washington, D.C.

**J. Bernard Machen, DDS, MS, PhD**

President  
University of Florida  
Gainesville, Fla.

**Kimberly McFarland, DDS, MHSA**

Dental Health Director  
Nebraska Health and Human Services System  
Lincoln, Neb.

**Edward R. Scott II, DMD**

Private Practitioner  
Past President  
National Dental Association  
Tallahassee, Fla.

**Jerry A. Tahsequah**

Associate Director  
Native American Center of Excellence  
University of Oklahoma Health Sciences  
Center  
Oklahoma City, Okla.

**Henrie M. Treadwell, PhD**

Director, Community Voices  
Healthcare for the Underserved Initiative  
Morehouse School of Medicine  
Atlanta, Ga.

**Richard W. Valachovic, DMD, MPH**

Executive Director  
American Dental Education Association  
Washington, D.C.

## APPENDIX 4

### Round 1 RWJF-Funded Projects in *Pipeline, Profession & Practice* (the *Dental Pipeline Program*)

#### **Boston University School of Dental Medicine** (Boston, Mass.)

ID# 46796 (September 2002–August 2008) \$1,349,880

ID# 63337 (November 2007–October 2008) \$99,954

##### **Project Director**

Ana Karina Mascarenhas, BDS, DPH

(617) 638-4456

[karinam@bu.edu](mailto:karinam@bu.edu)

#### **Howard University College of Dentistry** (Washington, D.C.)

ID# 46804 (September 2002–August 2007) \$1,349,839

ID# 63158 (September 2007–February 2009) \$98,754

##### **Project Director**

Donna Grant-Mills, DDS

(202) 806-0377

[d\\_grant-mills@howard.edu](mailto:d_grant-mills@howard.edu)

#### **Meharry Medical College School of Dentistry** (Nashville, Tenn.)

ID# 46806 (September 2002–August 2007) \$1,419,766

ID# 63172 (September 2007–August 2008) \$100,000

##### **Project Director**

Cherae Farmer-Dixon, DDS

(615) 327-6076

[cdixon@mmc.edu](mailto:cdixon@mmc.edu)

#### **Ohio State University College of Dentistry** (Columbus, Ohio)

ID# 46807 (September 2002–August 2007) \$1,500,000

ID# 63152 (November 2007–April 2009) \$98,450

##### **Project Director**

Canise Y. Bean, DMD, MPH

(614) 688-5567

[bean.26@osu.edu](mailto:bean.26@osu.edu)

**Temple University School of Dentistry** (Philadelphia, Pa.)

ID# 47952 (March 2003–August 2007) \$738,157

**Project Director**

R. Ivan Lugo, DMD, MBA

(215) 707-7710

[ilugo@dental.temple.edu](mailto:ilugo@dental.temple.edu)

**University of California, San Francisco, School of Dentistry** (San Francisco, Calif.)

ID# 46808 (September 2002–August 2008) \$1,345,319

**Project Director**

William F. Bird, DDS, DrPH

(415) 476-4038

[birdb@dentistry.ucsf.edu](mailto:birdb@dentistry.ucsf.edu)

**University of Connecticut School of Dental Medicine** (Farmington, Ct.)

ID# 46799 (September 2002–June 2009) \$1,354,251

ID# 63336 (November 2007–June 2009) \$97,198

**Project Director**

Cynthia E. Hodge, DMD

(860) 679-3470

[hodge@uchc.edu](mailto:hodge@uchc.edu)

**University of Illinois at Chicago College of Dentistry** (Chicago, Ill.)

ID# 46795 (September 2002–August 2008) \$1,500,000

ID# 63170 (September 2007–December 2008) \$100,000

**Project Director**

Caswell A. Evans, DDS, MPH

(312) 413-2474

[casevans@uic.edu](mailto:casevans@uic.edu)

**University of North Carolina at Chapel Hill School of Dentistry** (Chapel Hill, N.C.)

ID# 46792 (September 2002–August 2008) \$1,287,617

**Project Director**

Ronald P. Strauss, DMD, PhD

(919) 966-2788

[ron\\_strauss@unc.edu](mailto:ron_strauss@unc.edu)

### **University of Washington School of Dentistry** (Seattle, Wash.)

ID# 46793 (September 2002–December 2009) \$1,495,920

#### **Project Director**

Douglass L. Jackson, DMD, PhD

(206) 221-5170

[jacksond@u.washington.edu](mailto:jacksond@u.washington.edu)

### **West Virginia University School of Dentistry** (Morgantown, W.Va.)

ID#: 046809 (September 2002–August 2007) \$631,861

ID# 63169 (September 2007–September 2008) \$99,962

#### **Project Director**

Shelia S. Price, DDS, MA

(304) 293-6646

[sprice@hsc.wvu.edu](mailto:sprice@hsc.wvu.edu)

## **APPENDIX 5**

### **American Dental Education Association Evaluation of the Dental Pipeline Connections Supplemental Grant Program During Round 1**

The American Dental Education Association evaluated RWJF's Dental Pipeline Connections Supplemental Grant Program. The national program office awarded \$50,000 grants to four Round 1 schools to develop mentoring programs for prospective and enrolled dental students who were members of underrepresented minorities. The evaluation included all of the schools except the University of Southern California School of Dentistry, which began its mentoring program too late to be evaluated.

Staff from the association's Center for Equity and Diversity conducted:

- An online survey completed by the three project directors or their designee
- A 45-minute phone interview with each project director
- Thirty-minute phone interviews with two mentors and two mentees

Association staff reported evaluation findings in a report to the national program office.

Key findings include the following:

- The projects at the University of Connecticut, University of Illinois at Chicago, and Meharry reached all of their overall program goals. Each:
  - Developed a practical plan to build or strengthen a mentoring program

- Created opportunities to foster and cement relationships between mentors and students
- Delegated one faculty or staff member with a successful track record of supporting underrepresented minority students to manage the project
- Each of the three evaluated projects also met its individual goals:
  - University of Connecticut School of Dental Medicine:
    - Increased participation of dentists who were underrepresented minorities as mentors in the school's mentoring program
    - Developed a network of mentors who were underrepresented minorities for pre-dental and pre-doctoral underrepresented minority students
    - Increased awareness between the underrepresented minorities dental workforce and the community of steps taken toward diversity at the School of Dental Medicine
  - University of Illinois at Chicago College of Dentistry used existing institutions that already collaborated with the college to develop a network of mentors.
  - Meharry Medical College School of Dentistry addressed ways to maintain its trend of increased minority dental school applicants and enrollees.
- Elements of a successful mentoring program included:
  - Strong leadership and commitment from faculty, alumni, and community practitioners
  - Specific expectations for both mentors and mentees, and training programs for both
  - An application that includes adequate information to support appropriate matching of mentors and mentees
  - Opportunities for mentees and mentors to interact
  - Journal keeping by mentees
- Positive outcomes of the program included:
  - Relationships built between mentors and mentees
  - Learning by both mentors and mentees
  - The opportunity for mentees to interact with practitioners of color who had experienced dental school and the issues the mentees were facing and had successfully completed dental school

## APPENDIX 6

### Overall Round 1 *Dental Pipeline Program* Evaluation Methodology

The methodology for the evaluation of Round 1 of the *Dental Pipeline Program* conducted by Ronald M. Andersen, PhD, and colleagues at the University of California, Los Angeles, included:

- Site visit interviews conducted in three waves at the RWJF-funded schools and in two waves at the California Endowment-funded schools
- Review of documents from the sites:
  - Annual implementation reports provided by all grantees, which included administrative data on structure, processes and outcomes of the program components
  - Annual financial reports
  - Syllabi from grantee schools to assess curricular revisions and identify innovative courses and teaching methods
  - A curriculum checklist of elements related to each school's community-based dental education curriculum
  - Data collected by each school at the community clinic sites
- American Dental Education Association Survey of Senior Dental Students, which evaluators, in collaboration with the association, revised to measure program-related changes in community-based dental education and clinical practice
- American Dental Association Survey of Pre-Doctoral Dental Education, which provided data to assess recruitment of underrepresented minority students to both Pipeline and non-Pipeline dental schools
- A faculty survey conducted twice, in 2004 and 2006, at each school
- "Contextual variables"—combinations of data elements to measure policy, delivery system, and university and population characteristics

In comparing Pipeline schools to non-Pipeline schools, the evaluators primarily used data from the American Dental Education Association, American Dental Association and the contextual data.

## APPENDIX 7

### Key Results From Round 1 Dental Pipeline Projects Funded by RWJF and Not Described in Key Site Results: Round 1

Evaluators reported project results from all 15 Round 1 projects (both RWJF- and California Endowment-funded) in the *Dental Pipeline Program* in a special supplement to the *Journal of Dental Education* in 2009. The supplement is available [online](#). See the [Bibliography](#) for details. Project staff also reported project results in reports to RWJF.

This appendix covers key results from the seven RWJF-funded Round 1 sites not described in [Key Site Results: Round 1](#) in this report.

#### ***Boston University School of Dental Medicine***

- ***Community-Based Clinical Education:*** The school increased the number of days spent in extramural rotations from 35 in 2002–03 to the targeted 60 in 2006–07. Students spend 50 days over 10 continuous weeks at a single community site, with the remaining 10 days spent at a pediatric dentistry rotation.
- ***Curriculum Revision:*** The school offers a curriculum on cultural competency that faculty, assisted by a cultural competency curriculum consultant, developed and refined over the program period. Faculty regularly evaluates the effectiveness of the curriculum in enhancing students' care of diverse populations.
- ***Recruitment of Underrepresented Minority and Low-Income Students:*** School of Dental Medicine staff developed a Master of Arts in Medical Sciences focusing on oral health, which targets dental school applicants not accepted due to deficient college grades or standardized test scores.

The degree program enhances students' academic foundations and reapplication. Students graduating with a 3.3 GPA are guaranteed admission to the dental school. This program is credited with increasing underrepresented minority enrollment. As of January 2007, 28 percent of students enrolling for fall 2007 were underrepresented minorities (three Blacks and six Hispanics).

#### ***Howard University College of Dentistry***

- ***Community-Based Clinical Education:*** At the beginning of the program, Howard senior students were spending no days in community dental settings; by 2006–07, they were spending 20 days per year in extramural clinics.
- ***Curriculum Revision:*** Curriculum change at Howard resulted in three courses that address cultural competency:
  - "Behavioral Dentistry"
  - "Ethics"

— "Public Health Dentistry I (The Health Delivery System)," II ("Special Populations and Geriatrics") and III ("Factors Directly Affecting Private and Community Practice")

- **Recruitment of Underrepresented Minority and Low-Income Students:** The number of underrepresented minority applications to Howard University College of Dentistry increased 79 percent, from 318 in 2002–03 to 568 in 2006–07; however, the number of enrollees actually decreased 11 percent over that period, from 61 to 54.

Although the number of Black applicants increased from 247 to 425, the number of Black enrollees decreased from 59 in 2002–03 to 49 in 2006–07. The number of Hispanic enrollees increased from two in 2002–03 to five in 2006–07, with nine in 2003–04 and eight in 2004–05.

Howard administrators believe that the school may be losing top Black students to non-Historically Black Colleges and Universities since those schools have stepped up their own recruiting efforts and are able to offer more scholarships and financial aid.

### **Temple University School of Dentistry**

- **Community-Based Clinical Education:** At the start of Temple's participation in the *Dental Pipeline Program* in 2003–04, students did not spend any days in community rotations; at the end, in 2006–07, students were spending 20 days during their senior year in community rotations. The Community-Based Dental Education Program was initially an honors program but has evolved to be a mandatory requirement for senior students.
- **Curriculum Revision:** Curriculum changes at Temple focused on supporting the community rotations and conducting cultural competency training.
- **Recruitment of Underrepresented Minority and Low-Income Students:** The number of underrepresented minority applicants to Temple increased 80 percent, from 187 in 2003–04 to 336 in 2006–07. The number of underrepresented minority enrollees also increased 80 percent during that period, from 10 to 18.

### **University of California, San Francisco, School of Dentistry**

- **Community-Based Clinical Education:** The University of California, San Francisco School of Dental Medicine, increased the number of days spent in extramural rotations from five in 2002–03 to 45 in 2006–07.
- **Curriculum Revision:** The school expanded and revised its cultural competency curriculum, incorporating culture-specific modules throughout the clinical core in each of the four years. Modules included Black, Chinese, Hispanic, Korean, Russian, Native American, Afghan, Iranian, and East Indian cultural competencies and an additional module devoted to gay/bisexual/lesbian/transgender issues.

- **Recruitment of Underrepresented Minority and Low-Income Students:** The number of underrepresented minority applicants increased from 121 in 2002–03 to 183 in 2006–07, an increase of 51 percent. The number of enrollees increased from 11 in 2002–03 to 15 in 2004–05 but decreased to four in 2006–07, a net decrease of seven students (or 64%) from the start of the program. Some University of California, San Francisco, administrators cited increased competition from many other dental schools for a limited pool of underrepresented minority students as one explanation for this decrease.

### **University of North Carolina at Chapel Hill School of Dentistry**

- **Community-Based Clinical Education:** The University of North Carolina initiated its community rotations program in the 1960s and, as of 2002–03, was placing senior students at community sites for an average of 40 days. In 2006–07, the average number of days had increased to 59. Preceptors from the sites have appointments to the dental faculty. The school requires rotations for graduation.
- **Curriculum Revision:** The curriculum has addressed issues related to cultural diversity since 1991. During the *Dental Pipeline Program*, the school revised the curriculum to concentrate the didactic content on cultural competence primarily in the second year and to include more direct contact with a set of economically and culturally diverse patients. Courses particularly related to preparation for community-based dental education include:
  - "Social and Ethical Issues in Dental Practice"
  - "Behavior, Communication & Culture"
  - "Community, Society and Health: A Distance Learning Reading Dental Elective Course"
- **Recruitment of Underrepresented Minority and Low-Income Students:** The number of underrepresented minority applicants increased 10 percent, from 77 in 2002–03 to 85 in 2006–07. The number of underrepresented minority enrollees decreased 29 percent during that period, from 17 to 12.

Including Asian-Pacific Islanders, 27 percent of the class of 2011 (entering fall 2007) was minority. An administrator credits an increased number of slots in summer programs for pre-dental students facilitated by the *Dental Pipeline Program* as an important recruitment tool. The administrator noted that consolidated underrepresented minority recruitment efforts have changed the cultural awareness at the school, enabling these students to thrive and resulting in a preponderance of minority students at the top levels of the graduating class.

### **University of Washington School of Dentistry**

- **Community-Based Clinical Education:** The University of Washington School of Dentistry increased the number of days seniors spent in extramural rotations from 16

in 2002–03 to 40 in 2006–07. About 24 of these days were required and covered pediatric, geriatric special needs, hospital-based dentistry and hospital-based emergency dentistry. Additional rotations were elective and about 25 of 55 students selected these rotations.

- **Curriculum Revision:** Given demands on the current curriculum, the University of Washington decided to incorporate new material on cultural competency into existing courses, rather than develop new, separate courses. Material designed to increase awareness of culture, communication, and privilege and to address the delivery of culturally competent care was integrated into:
  - A three-section "Communication Skills" course
  - A course called "Social and Historical Perspectives in Dentistry"
- **Recruitment of Underrepresented Minority and Low-Income Students:** The number of underrepresented minority applicants increased 59 percent, from 27 in 2002–03 to 43 in 2006–07. The number of underrepresented minority enrollees increased 233 percent during that period, from three to 10.

The school made a variety of changes to its recruitment and admissions efforts, including introducing minority interviewees to minority faculty members to allow them to inquire about the environment at the school and other issues.

### **West Virginia University School of Dentistry**

- **Community-Based Clinical Education:** West Virginia University School of Dentistry had initiated a six-week externship in 1978. This program, with 30 days of senior externship experience at rural sites, was in place when the *Dental Pipeline Program* began. Students provide services to the homeless, elderly, indigent children and families, and individuals with special needs.

The days spent at the community-based sites increased to 36 by 2004–05. At that point, the extramural assignments reached a plateau. Faculty members expressed concern that students' ability to perform on the state board examination and graduate on time would be affected by additional time off campus.

- **Curriculum Revision:** West Virginia followed an "infusion model" that integrated cultural competency content across the curriculum, with the guidance of a Behavioral Science/Clinical Science Correlation subcommittee to its Curriculum Committee and the advice of cultural competency curriculum consultants.
- **Recruitment of Underrepresented Minority and Low-Income Students:** In West Virginia, only about 5 percent of the population is minority, mostly Black. When the *Dental Pipeline Program* began, there were no Black, Hispanic, or Native American students at the School of Dentistry. There also were very few low-income students. The school focused on long-term pipeline efforts targeted at students from sixth grade through their sophomore year of college.

In 2005, at the recommendation of the national program office, the school instituted a two-year Turn-Around Plan to improve underrepresented minority and low-income enrollment. As a result, in 2006–07, the number of underrepresented minority applicants and enrollees had increased from none in 2002–03 to 86 and six, respectively.

## APPENDIX 8

### Round 2 National Advisory Committee

**Charles J. Alexander, PhD**

Associate Vice Provost, Student Diversity  
Director, Academic Advancement Programs  
University of California at Los Angeles  
Los Angeles, Calif.

**Carole Anderson, PhD, MSN, BSN**

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Endodontist  
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**Ernest L. Garcia Jr., DDS**

Private practitioner  
President  
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**Curtis Harris, MPA**

Manager of Faculty Sponsored Research  
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**Kimberly McFarland, DDS, MHSA**

Dental Health Director  
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Lincoln, Neb.

**Shelia Price, DDS, EdD**

Associate Dean for Admissions, Recruitment,  
and Access  
School of Dentistry  
West Virginia University  
Morgantown, W.Va.

**Kathleen Roth, DDS**

Past President  
American Dental Association  
Private practitioner  
West Bend, Wis.

**Richard W. Valachovic, DMD, MPH**

Executive Director  
American Dental Education Association  
Washington, D.C.

## APPENDIX 9

### Round 2 RWJF-Funded Projects in *Pipeline, Profession & Practice* (the *Dental Pipeline Program*)

#### ***Schools Focused on Recruitment of Underrepresented Minority or Low-income Students:***

##### **A. T. Still University, Arizona School of Dentistry and Oral Health (Mesa, Ariz.)**

ID# 63810 (March 2008–November 2010) \$195,548

###### **Project Director**

Donald S. Altman, DDS, MPH, MBA, MA

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##### **Creighton University School of Dentistry (Omaha, Neb.)**

ID# 63806 (March 2008–August 2011) \$200,000

###### **Project Director**

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##### **Texas A&M Health Science Center Baylor College of Dentistry (Dallas, Texas)**

ID# 63802 (March 2008–May 2010) \$199,631

###### **Project Director**

Ernestine S. Lacy, DDS, MA

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##### **Virginia Commonwealth University, School of Dentistry (Richmond, Va.)**

ID# 63804 (March 2008–May 2010) \$155,262

###### **Project Director**

Carolyn L. Booker, PhD, MA

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## ***Schools Focused on Community-Based Education***

### **Medical College of Georgia Research Institute, Inc. (on behalf of the School of Dentistry) (Augusta, Ga.)**

ID# 63807 (March 2008–May 2010) \$193,570

#### **Project Director**

Carole M. Hanes, DMD

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### **University of Florida College of Dentistry (Gainesville, Fla.)**

ID# 63803 (March 2008–May 2011) \$120,792

#### **Project Director**

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### **University of Maryland Baltimore College of Dental Surgery (Baltimore, Md.)**

ID# 63809 (March 2008–December 2010) \$186,805

#### **Project Director**

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### **Foundation of the University of Medicine and Dentistry of New Jersey (on behalf of the New Jersey Dental School) (New Brunswick, N.J.)**

ID# 63801 (March 2008–May 2010) \$200,000

#### **Project Director**

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## APPENDIX 10

### Examples of Sustainability at the Round 2 Dental Pipeline Sites

- Baylor College of Dentistry continued its *Bridge to Dentistry* program with support from a federal Health Resources and Services Administration (HRSA) grant that ended in August 2012. As of July 2012, the school has applied for a Centers of Excellence grant, also from HRSA. The school is committed to the program’s continuation.
- Georgia Medical College School of Dentistry has applied for renewal of a HRSA grant that ends in August 2012. As of July 2012, the program continues “full-bore,” according to Hanes.
- At the New Jersey Dental School (NJDS), student financial aid budgets have been increased to cover the costs of students’ participation at community sites (e.g., travel, housing, etc.), “underscoring the fact that the rotations have been permanently incorporated as a mandatory part of NJDS curriculum, and assuring their sustainability,” according to project staff.
- Creighton University Dental School has set a target to recruit two to three American Indian students annually. One to two Native American students will also be enrolled in the post-baccalaureate program each year.

## APPENDIX 11

### Key Results from Round 2 Projects Funded by RWJF and Not Described Earlier

National program and project staff reported the following results from individual projects in reports to RWJF.

#### ***Schools Focused on Recruitment of Underrepresented Minority or Low-Income Students:***

##### Arizona School of Dentistry & Oral Health

- **Arizona School of Dentistry & Oral Health hosted four pre-admissions workshops for 42 underrepresented minority pre-dental students, twice the proposed target of two workshops and 20 students.** Staff recruited pre-dental students from historically black colleges and universities for the workshops, which offered “inside track” information and activities designed to smooth the dental school application process (mock interviews, Dental Admissions Test preparation, etc.). Current dental students were heavily involved in workshop planning, recruitment, and support, and in mentoring participants.

- **As of December 2010, three of the 42 workshop participants have matriculated at Arizona School of Dentistry & Oral Health, seven planned to enroll in 2011, and one had been accepted to medical school.**
- **The school significantly increased the amount of financial assistance awarded to underrepresented minority students—\$634,087 during the *Dental Pipeline* period, compared with a project target of \$100,000.**

#### Creighton University School of Dentistry

- **Creighton University School of Dentistry established the Jesuit Dental School Recruitment Collaborative with Marquette University School of Dentistry and Gonzaga University to recruit American Indian dental students.** Staff conducted recruitment visits to feeder universities for Native American students and partnered with related organizations and programs to target potential American Indian dental students.
- **A four-week summer enrichment program served 16 American Indian undergraduate students.** Thirteen of these students have enrolled in, applied to, or intend to apply to dental school.
- **A 13-month pre-dental post-baccalaureate program enrolled six American Indian students.** At the end of the grant period, four students were attending Creighton Dental School, one was attending Oklahoma Dental School, and the sixth was continuing as a pre-dental student.
- **A total of 12 new American Indian dental students were admitted to two of the Jesuit Dental School Recruitment Collaborative dental schools between 2009 and 2011: 10 at Creighton and two at Marquette.**

These American Indian enrollments are “incredible—the most anyone has,” said National Program Co-Director Formicola. “They’re making a difference and that’s going to be powerful to the Native American community, which has some of the worst oral disease levels.”

#### Virginia Commonwealth University School of Dentistry

- **The school expanded its ongoing summer program for high school students and enrolled 30 students.** A survey of participants indicated that 58 percent had plans for a career in the health professions, with 50 percent interested in dentistry.
- **The school developed VCU Scholars, an academic year program for high-school students to develop and strengthen academic skills and involve parents in several aspects of applying to college.** Twenty-eight students participated. Of the 13 students who participated in the first year, about half (based on a survey) indicated interest in the health professions, with a third interested in dentistry.

- **A five-week summer program helped college students develop skills useful in applying to and enrolling in dental school.** Some 35 students participated; of these two were enrolled in dental school and 22 said that they planned to apply.
- **Two workshops held in different parts of the state provided pre-health advisers with information designed to help them better advise students about careers in dentistry.**

### ***Schools Focused on Community-Based Education***

#### **University of Florida College of Dentistry**

- **The College of Dentistry increased the dental student community-based rotation from four to six weeks.**
- **The school revised the existing curriculum to include seminars before and after the community-based rotation.** These seminars include lectures and group discussions on topics such as access to care, the culture of poverty, health care advocacy, and the structure and philosophy of the Medicaid system.
- **“Florida has raised a great deal of federal money to continue to expand its programs in the community,” said national program Co-Director Bailit.**

#### **University of Maryland, Baltimore, College of Dental Surgery**

- **The College of Dental Surgery built a 26-chair facility (the University of Maryland Dental School-Perryville) to provide dental services to underserved communities in northeastern Maryland—in collaboration with a local hospital, Cecil College, three county health departments and Head Start centers, the local school system, the county dental society, and others.** Dental and dental hygiene students began community-based rotations at the facility in September 2009.

“There is a lot of poverty in this part of the state,” Formicola pointed out. “They built a special clinic in that area and are using it as a major site, similar to some of the new dental schools, but this is an established school that decided that they needed to have care out there and they built a building.”

- **The school’s community-based service rotation for fourth-year students increased from three weeks to six weeks, divided into two three-week experiences.** One of the rotations is at the Perryville facility. First-year students spend one week at the facility, which provides them with a rural experience that contrasts with their usual urban experience at the school in Baltimore.
- **“The impact of this project has been tremendous,” said Project Directors Carroll Ann Trotman, BDS, and Norman Tinanoff, DMD. According to Trotman and Tinanoff** students enjoy learning at the new facility with its modern clinical equipment and the level of care they provide. Faculty enjoys teaching in this

real-world setting and the community is appreciative of the much-needed care that is now available.

### University of Medicine and Dentistry of New Jersey, New Jersey Dental School

- **Project staff developed online instruments for students to reflect on their Community Oriented Dental Education rotation experience.** All students participating in the program in 2009 and 2010 (except for one) completed the reflections.
- **Compared with the baseline 2008 year, when 15 percent of senior students participated in the Community Oriented Dental Education rotations, 100 percent of senior students participated in 2009 and 2010.**
- **Students received credit for the work performed at the community sites, which included a full range of dental services.** Grading and evaluations of the work performed by students used the same criterion-based systems used at the dental school.
- **Compared to 2008, the combined 2009 and 2010 classes provided nearly 8,500 patient visits that would not otherwise have occurred without the grant funding.** The New Jersey Dental School has institutionalized the program and students will continue to provide these extras visits, thereby increasing access to care for previously underserved patients.

## APPENDIX 12

### Additional Lessons Learned From the *Dental Pipeline Program*

#### ***Community-Based Dental Education Lessons***

1. **Set clear expectations for students working in community-based sites; do this in an orientation before they meet any patients.** Project staff at Ohio State University offered an orientation program and encouraged students to talk with patients as doctors, not as students, so that the patients would have confidence in their work. Staff at New Jersey Dental School developed and distributed a comprehensive orientation package that outlined expectations and provided other information. (Public Health Dental Clinic Director, Ohio State University; Project Director, New Jersey Dental School))
2. **Ensure that community site directors have time to oversee students, especially in the first part of the year.** Project staff at the University of Connecticut initially had residents oversee students. The program worked much better after staff began requiring community site directors to oversee students.

A community dentist at a site used by the University of Illinois at Chicago added that staff dentists should be very interactive with students and provide constructive

feedback. (Project Director, University of Connecticut; Dental Director, Union Medical Center, University of Illinois at Chicago)

3. **Maintain good communication between the school and the community sites.** Project staff at the University of Illinois at Chicago developed a program in which students talked with dental school faculty about their experiences with community-based dental education to foster this communication. Staff members also were flexible and willing to make changes. For example, they found that some students were better suited to certain types of clinics than others. (Director, Site Assessment for Extramural Education Programs, University of Illinois at Chicago)
4. **Offer faculty appointments and opportunities to participate in continuing education programs to clinicians at the community-based clinics in which students do their rotations.** Pipeline schools did this and found that such opportunities enhanced clinic staff morale and training and helped the clinics recruit future practitioners. Clinic directors are mainly minority practitioners; they become faculty members and role models for all students. (National Program Staff)
5. **“Think outside the box” when seeking housing options for students doing community rotations far from campus.** Finding accessible, affordable, and safe housing for Medical College of Georgia School of Dentistry students doing community rotations required diligence and a willingness to consider every possibility, including other college campuses (during the summer), motels, and private homes. (Project Director, Medical College of Georgia School of Dentistry)

### ***Recruitment of Underrepresented Minority Students Lessons***

6. **Start promoting elementary through high-school career awareness and academic enrichment programs for underrepresented minorities and students from disadvantaged backgrounds early and make personal contact with students, parents, and teachers.** Use multiple avenues to promote the programs and be aware that “word of mouth” advertising is very effective across all educational levels. Interactive activities are most enjoyable for students and most likely to result in them spreading the word about their participation. (Project Director, Baylor College of Dentistry)
7. **Start working with underrepresented minority students in their freshman year of college in order to increase not just the number of underrepresented minority applicants in general, but especially the number of qualified applicants who are likely to be accepted into dental school.** (Project Director, Meharry)
8. **Use summer enrichment programs and post-baccalaureate programs to develop underrepresented minority college students' interest in dentistry and their ability to enter dental school.** Summer enrichment programs used in the *Dental Pipeline Program* increased the competitiveness of underrepresented minorities as applicants to dental school. Post-baccalaureate programs increased the percentage of

underrepresented minority applicants who actually enrolled in dental school.  
(National Program Staff)

9. **Foster relationships with pre-health academic advisers and faculty members of undergraduate colleges and universities to provide information to underrepresented minority students and obtain recommendations on potential applicants.** Admissions staff at Arizona School of Dentistry & Oral Health especially recruited heavily at historically Black colleges and universities to strengthen its pipeline. (Project Director, Arizona School of Dentistry and Oral Health)
10. **Take a hands-on approach to underrepresented minority recruitment, staying in contact with applicants throughout the application and admissions processes.** Many underrepresented minority students do not get adequate help from their college advisers. The participating dental schools that had successful underrepresented minority recruitment programs used a hands-on approach and provided extra guidance to their applicants. (National Program Staff)
11. **Implement "whole file review" of applicants that considers both quantitative measures (such as Dental Admission Test scores and grade point averages) and qualitative factors (such as motivation, life experiences, etc.).** By broadening admissions review to consider all of the attributes of candidates, participating schools were able to enroll more underrepresented minorities. (National Program staff)
12. **Address the dental school's diversity climate, especially if it lacks a critical mass of underrepresented minority students, so that these students will feel welcome.** At some schools, the lack of both minority faculty who could act as role models and a critical mass of underrepresented minority students to provide a peer group presented a significant challenge in attracting additional underrepresented minority dental students. (National Program Staff)
13. **Enlist current underrepresented minority dental students in recruitment and retention activities targeted to prospective and new minority students.** Their involvement contributed strongly to the effectiveness of the project at Arizona School of Dentistry & Oral Health. (Project Director, Arizona School of Dentistry & Oral Health)
14. **Use external stimuli to evoke change in admissions practices.** Dental schools that participated in admissions workshops offered by the national program office improved their enrollment of underrepresented minority students, with four of six schools showing an increase in underrepresented minority enrollment after workshop participation. (National Program Staff)
15. **Target American Indian students early in their undergraduate education, as many have little knowledge about dental school requirements due to a lack of role models.** Visit with tribal people and establish relationships that will influence them to encourage their students to consider a dental career. (Project Director, Creighton University School of Dentistry)

**16. Students who have tribal affiliations and strong cultural backgrounds are most likely to practice dentistry in an underserved area.** Creighton University School of Dentistry found it helpful to ask for evidence of tribal affiliation during admissions and interest in practicing dentistry among tribal people as a way to develop dentists willing to serve in tribal areas. (Project Director, Creighton University School of Dentistry)

## BIBLIOGRAPHY

(Current as of date of the report; as provided by the grantee organization; not verified by RWJF; items not available from RWJF.)

### National Program Office Bibliography

#### Books

Bailit HL, Beazoglou T and Formicola A. "The Dental Curriculum and the Cost of Dental Education." In *The Economics of Dental Education*, Brown L and Meskin L (eds). Chicago: American Dental Association, 2004.

#### Articles

Baez R, Butler W, D'Abreu K, Drisko C, Erwin K, Formicola A, Herrmann G, Jackson D, Kennedy J, Lopez S, Rouse L, Sinkford J, Tahsequah J, Tedesco L and Treadwell H. "Bridging the Gap: Partnerships Between Dental Schools and Colleges to Produce a Workforce to Fully Serve America's Diverse Communities." *Community Voices: Healthcare for the Underserved*, Item #610, 2007. Available [online](#).

Bailit HL. "Health Services Research." *Advances in Dental Research*, 17(1): 82–85, 2003.

Bailit HL. "Commentary on "Community-Based Approaches to Strengthen Cultural Competence in Nursing Education and Practice." *Journal of Transcultural Nursing*, 18(1 suppl.): 64S–65S, 2007.

Bailit HL and Beazoglou T. "State Financing of Dental Education: Impact on Supply of Dentists." *Journal of Dental Education*, 67(12): 1278–1285, 2003.

Bailit HL and Beazoglou TJ. "The Supply of Dental Services: What Are the Issues?" *The National AHEC Bulletin* 23(1): 3-6, 2007.

Bailit H and Beazoglou T. "Financing Dental Care: Trends in Public and Private Dental Expenditures for Dental Services." *Dental Clinics of North America*, 52: 281, 2008. Abstract available [online](#). Full text requires subscription or fee.

Bailit H, Beazoglou T, Demby N, McFarland J, Robinson P and Weaver R. "Dental Safety Net: Current Capacity and Potential for Expansion." *Journal of the American Dental Association*, 137(6): 807–816, 2006. Abstract available [online](#). Full text requires subscription or fee.

Bailit HL, Beazoglou TJ, Formicola AJ and Tedesco L. "Financing Clinical Dental Education." *Journal of Dental Education*, 71(3): 322–330, 2007. Available [online](#).

Bailit HL, Beazoglou T, Formicola A, Tedesco L, Brown LJ and Weaver R. "U.S. State Supported Dental Schools' Financial Projections and Implications." *Journal of Dental Education*, 70(3): 246–257, 2006.

Bailit HL, Formicola AJ, D'Abreu KC, Bau I, Zamora G and Stavisky JS. "The *Dental Pipeline Program*: The National Program Office Perspective." *Journal of the American Dental Association*, 73(2 Suppl.): S15–S22, 2009. Available [online](#).

Bailit HL, Formicola AJ, Herbert KD, Stavisky JS and Zamora G. "The Origins and Design of the *Dental Pipeline Program*." *Journal of Dental Education*, 69(2): 232–238, 2005. Available [online](#).

Bailit HL, Weaver R, Haden K, Kotowicz W and Hovland E. "Dental Education Summits: The Challenges Ahead." *Journal of the American Dental Association*, 134(8): 1109–1113, 2003.

Bean CY, Rowland ML, Soller H, Casamassimo P, Van Sickle R, Levings K and Agunga R. "Comparing Fourth-Year Dental Student Productivity and Experiences in a Dental School with Community-Based Clinical Education." *Journal of Dental Education*, 71(8): 1020–1026, 2007. Available [online](#).

Formicola AJ and Bailit HL. "Community-Based Dental Education: History, Current Status, and Future," *Journal of Dental Education*, 76(1): 98–106, 2012. Abstract available [online](#).

Formicola A Bailit HL, Beazoglou TJ and Tedesco LA, (The Macy Study Team), "Introduction to the Macy Study Report," *Journal of Dental Education*, 72(2 Suppl.): S5–S9, 2008. Available [online](#).

Formicola A Bailit HL, Beazoglou TJ and Tedesco LA. "The Macy Study: A Framework for Consensus." *Journal of Dental Education*, 72(2 Suppl.): S95–S97, 2008.

Formicola AJ, Bailit H, D'Abreu K, Stavisky J, Bau I, Zamora G and Treadwell H. "The *Dental Pipeline Program*'s Impact on Access Disparities and Student Diversity." *Journal of the American Dental Association*, 140(3): 346–353, 2009. Available [online](#) with subscription or fee.

Formicola A, Klyvert M, McIntosh J, Thompson A, David M and Cangialosi T. "Creating an Environment for Diversity in Dental Schools: One School's Approach." *Journal of Dental Education*, 67(25): 491–495, 2002.

Formicola AJ, Stavisky J and Lewy R. "Cultural Competency: Dentistry and Medicine Learning from One Another." *Journal of Dental Education*, 67(8): 869–875, 2003. Available [online](#).

Gregorczyk S and Bailit HL. "Assessing the Cultural Competency of Dental Students and Residents." *Journal of Dental Education*, 72(10): 1122–1127, 2008. Available [online](#) with a subscription or a fee.

Hryhorczuk C, Bolden AJ, Knight GW, Punwani I, Mulvihill DM, Noorullah K and Evans CA. "A Model for Selection and Assessment of Community-Based Sites for Dental Students' Extramural Clinical Experiences." *Journal of Dental Education*, 72(2): 153–171, 2008. Available [online](#).

Itaya LE, Glassman P, Gregorczyk S and Bailit HL. "Dental School Patients with Limited English Proficiency: The California Experience." *Journal of Dental Education*, 73: 1055–1064, 2009. Available [online](#) with subscription or fee.

Kuthy RA, Woolfolk M, Bailit HL, Formicola AJ and D'Abreu KC. "Assessment of the *Dental Pipeline Program* from the External Reviewers and National Program Office." *Journal of Dental Education*, 73(2 Suppl.): S331–S339, 2009. Available [online](#).

Mascarenhas AK, Freilich SR, Henshaw MM, Jones JA, Mann ML and Frankl SN. "Evaluating Externship Programs: Impact of Program Length on Clinical Productivity." *Journal of Dental Education*, 71(4): 516–523, 2007. Available [online](#).

Mofidi M, Strauss R, Pitner LL and Sandler ES. "Dental Students' Reflections on Their Community-Based Experiences: The Use of Critical Incidents." *Journal of Dental Education*, 67(5): 515–523, 2003. Available [online](#).

Price SS, Brunson WD, Mitchell D, Alexander CJ and Jackson DL. "Increasing the Enrollment of Underrepresented Minority Dental Students: Experiences from the *Dental Pipeline Program*." *Journal of Dental Education*, 71(3): 339–347, 2007. Available [online](#).

Rowland ML, Bean CY and Casamassimo PS. "A Snapshot of Cultural Competency Education in U.S. Dental Schools." *Journal of Dental Education*, 70(9): 982–990, 2006. Available [online](#).

Strauss R, Mofidi M, Sandler ES, Williamson R, McMurty BA, Carl LS and Neal EM. "Reflective Learning in Community-Based Dental Education." *Journal of Dental Education*, 67(11): 1234–1242, 2003. Available [online](#).

Veal K, Perry M, Stavisky J and D'Abreu Herbert K. "The Pathway to Dentistry for Minority Students: From Their Perspective." *Journal of Dental Education*, 68(9): 938–946, 2004. Available [online](#).

Wagner J, Arteaga S, D'Ambrosio J and Hodge C. "Dental Students' Attitudes Toward Treating Diverse Patients: Effects of a Cross-Cultural Patient-Instructor Program." *Journal of Dental Education*, 72(10): 1128–1134, 2008. Available [online](#) with a subscription or a fee.

Wagner J, Arteaga S, D'Ambrosio J, Hodge CE, Ioannidou E, Pfeiffer CA, Yong L and Reisine S. "A Patient-Instructor Program to Promote Dental Students' Communication Skills with Diverse Patients." *Journal of Dental Education*, 72(12): 1554–1560, 2007. Available [online](#).

### Journal Supplements

Bailit HL and Formicola AJ (eds.). "Successful Community-Based Dental Education Programs and Underrepresented Minority Dental Student Recruitment and Enrollment Programs. A Report and Guide from the Pipeline, Profession, and Practice: Community-Based Dental Education Program." *Journal of Dental Education*, 74(10 Suppl.), 2010. Available [online](#).

- Bailit HL and Formicola AJ. “Preface: About the *Dental Pipeline Program*,” S5–S6. Available [online](#).
- Lavizzo-Mourey R. “Foreward,” S7–S8. Available [online](#).
- Bailit HL. “Organization and Management of Community-Based Dental Education Programs: An Overview from the *Dental Pipeline Program*,” S9–S16. Available [online](#).
- Mascarenhas AK and Henshaw M. “Infrastructure for a Community-Based Dental Education Program: Students and Clinics,” S17–S24. Available [online](#).
- Evans CA, Bolder AJ, Hryhorczuk C and Noorullah K. “Management of Experiences in Community-Based Dental Education,” S25–S32. Available [online](#).
- Bailit HL. “Financial Impact of Community-Based Dental Education,” S33–S41. Available [online](#).
- Strauss RP, Stein MB, Edwards J and Nies KC. “The Impact of Community-Based Dental Education on Students,” S42–S55. Available [online](#).
- Perry M. “The Experiences of Community Dental Clinic Directors with Dental Students and Dental School Collaborations,” S56–S61. Available [online](#).
- Hood JG. “Reflections on the *Dental Pipeline Program*’s Efforts Regarding Community-Based Dental Education,” S62–S66. Available [online](#).
- Formicola AJ, D’Abreu KC and Tedesco LA. “Underrepresented Minority Dental Student Recruitment and Enrollment Programs: An Overview from the *Dental Pipeline Program*,” S67–S73. Available [online](#).
- Brunson WD, Jackson DL, Sinkford JC and Valachovic RW. “Components of Effective Outreach and Recruitment Programs for Underrepresented Minority and Low-Income Dental Students,” S74–S86. Available [online](#).
- Price SS and Grant-Mills D. “Effective Admissions Practices to Achieve Greater Student Diversity in Dental Schools,” S87–S97. Available [online](#).
- Pendleton DD and Graham BS. “The Role of the Dental School Environment in Promoting Greater Student Diversity,” S98–S109. Available [online](#).
- Alexander CJ and Mitchell DA. “The Role of Enrichment Programs in Strengthening the Academic Pipeline to Dental Education,” S110–S120. Available [online](#).
- Nivet MA. “Reflections on the *Dental Pipeline Program*’s Efforts Regarding Underrepresented Minority Dental Students,” S121–S123. Available [online](#).

Bailit H and McGowan T (eds.). “Assessing the Impact of Community-Based Education on Dental School Finances.” *Journal of Dental Education*, 75 (10 Suppl.): 2011. Abstracts for most articles available [online](#). Full text requires subscription or fee.

- Bailit HL and McGowan TL. “Assessing the Impact of Community-Based Education on Dental School Finances: Introduction to the Report,” S5–S7.
- Bailit HL and McGowan TL. “Senior Dental Students’ Impact on Dental School Clinic Revenues: The Effect of Community-Based Dental Education,” S8–S13. Abstract available [online](#).
- Knight GW. “Community-Based Dental Education at the University of Illinois at Chicago,” S14–S20. Abstract available [online](#).
- Mascarenhas AK. “Community-Based Dental Education at Boston University,” S21–S24. Abstract available [online](#).
- Bean CY. “Community-Based Dental Education at The Ohio State University: The OHIO Project,” S25–S35. Abstract available [online](#).
- Mashabi S and Mascarenhas AK. “Impact of Community Externships on the Clinical Performance of Senior Dental Students,” S36–S41. Abstract available [online](#).
- Piskorowski W, Bailit HL, McGowan TL and Krell RE. “Dental School and Community Clinic Financial Arrangements,” S42–S47. Abstract available [online](#).
- Le H, McGowan TL and Bailit HL. “Community-Based Dental Education and Community Clinic Finances,” S48–S53. Abstract available [online](#).
- Brown LJ and Bailit HL. “Policy Implications of Assessing the Impact of Community-Based Education on Dental School Finances,” S54–S56. Abstract available [online](#).

### **Reports**

*From Their Perspective: The Pathway to Dentistry for Minority Students*. Washington: Lake Snell Perry & Associates, 2003.

*Racial/Ethnic Disparities and Cross Cultural Care*, a webcast presented by Joseph Betancourt, MD, MPH New York: Center for Community Health Partnerships, January 23, 2003. A CD of the webcast is available from Deputy Program Director [Kim D'Abreu](#).

### **Meetings and Conferences**

Allan J. Formicola, Howard Bailit, Dave Brunson, Charles Alexander, Shelia Price and Dennis Mitchell, "Increasing the Enrollment of Underrepresented Students: New Strategies and Opportunities," at the Annual Meeting of the American Dental Education Association, March 6, 2005, Baltimore. Conference proceedings available [online](#).

Monty MacNeil, Donna Grant-Mills, Cynthia Hodge, Steven M. Lepowsky, R. Ivan Lugo, Ana Karina Mascarenhas, Leo E. Rouse, Ronald P. Strauss and Sheila Strorer, "Community-Based Dental Education: The Key to Successful Programs," at the Annual Meeting of the American Dental Education Association, March 9, 2006, Baltimore. Conference proceedings available [online](#).

## Communication and Promotion

[www.dentalpipeline.org](http://www.dentalpipeline.org). "Pipeline, Profession & Practice: Community-Based Dental Education" includes program background and description of Rounds 1 and 2, news items, links to related resources and other information. New York: Columbia University School of Dental and Oral Surgery, launched 2002, redesigned 2004.

## Evaluation (Round 1) Bibliography

### Articles

Andersen RM, Carreon DC, Friedman J-A, Baumeister SE, Afifi AA, Nakazono TT and Davidson PL. "What Enhances Underrepresented Minority Recruitment to Dental Schools?" *Journal of Dental Education*, 71(8): 994–1008, 2007. Available [online](#).

Andersen RM, Davidson PL, Atchison KA, Hewlett E, Freed JR, Friedman J-A, Thind A, Gutierrez JJ, Nakazono TT and Carreon DC. "Pipeline, Profession, and Practice Program: Evaluating Change in Dental Education." *Journal of Dental Education*, 69(2): 239–248, 2005. Available [online](#).

Baumeister SE, Davidson PL, Carreon DC, Nakazono TT, Gutierrez JJ and Andersen RM. "What Influences Dental Students to Serve Special Care Patients?" *Special Care Dentist*, 27(1): 15–22, 2007. Abstract available [online](#).

Davidson PL, Carreon DC, Baumeister SE, Nakazono TT, Gutierrez JJ, Afifi AA and Andersen RM. "Influence of Contextual Variables and Community-Based Dental Education on Practice Plans of Graduating Seniors." *Journal of Dental Education*, 71(3): 403–418, 2007. Available [online](#).

Hewlett ER, Davidson PL, Nakazono TT, Baumeister SE, Carreon DC and Freed JR. "Effect of School Environment on Dental Students' Perceptions of Cultural Competency Curricula and Preparedness to Care for Diverse Populations." *Journal of Dental Education*, 71(6): 810–818, 2007. Available [online](#).

Thind A, Atchison KA and Andersen RM. "What Determines Positive Student Perceptions of Extramural Clinical Rotations? An Analysis Using 2003 ADEA Senior Survey Data." *Journal of Dental Education*, 69(3): 355–362, 2005. Available [online](#).

Thind A, Atchison KA, Andersen RM, Nakazono TT and Gutierrez JJ. "Reforming Dental Education: Faculty Members' Perceptions on the Continuation of Pipeline Program Changes." *Journal of Dental Education*, 72(12): 1472–1480, 2008. Available [online](#) with a subscription or a fee.

### Journal Supplements

Andersen RM and Davidson PL (eds.). "Evaluating the Dental Pipeline Program: Recruiting Minorities and Encouraging Community-Based Dental Education." *Journal of Dental Education*, 73(2 Suppl.), 2009. Available [online](#).

- Andersen RM and Davidson PL. "Introduction to the Evaluating the *Dental Pipeline Program* Report," S10–S14. Available [online](#).
- Bailit HL, Formicola AJ, D'Abreu KC, Bau I, Zamora G and Stavisky JS. "The *Dental Pipeline Program*: The National Program Office Perspective," S15–S22. Available [online](#).
- Carreon DC, Davidson PL and Andersen RM. "The Evaluation Framework for the *Dental Pipeline Program* with Literature Review," S23–S36. Available [online](#).
- Davidson PL, Nakazono TT, Afifi A and Gutierrez JJ. "Methods for Evaluating Change in Community-Based Dental Education," S37–S51. Available [online](#).
- Gutierrez, JJ, Nakazono TT, Carreon DC and Anderson RM. "Introduction to Case Studies of the Pipeline Programs at Fourteen U.S. Dental Schools," S52–S57. Available [online](#).
- Crall JJ, Hewlett ER, Friedman J-A, Mascarenhas AK, Freilich S, Henshaw M, Jones JA, Mann M and Frankl S. "The Pipeline Program at Boston University Goldman School of Dental Medicine," S58–S69. Available [online](#).
- Andersen RM, Atchison KA, Hewlett ER and Grant-Mills D. "The Pipeline Program at Howard University College of Dentistry," S70–S82. Available [online](#).
- Friedman J-A, Thind A, Davidson PL and Farmer-Dixon C. "The Pipeline Program at Meharry Medical College School of Dentistry," S83–S95. Available [online](#).
- Thind A, Hewlett ER, Andersen RM and Bean CY. "The Pipeline Program at The Ohio State University College of Dentistry: Oral Health Improvement through Outreach (OHIO) Project," S96–S107. Available [online](#).
- Davidson PL, Thind A, Friedman J-A, Carreon D and Hodge C. "The Pipeline Program at the University of Connecticut School of Dental Medicine," S108–S119. Available [online](#).
- Atchison KA, Hewlett ER, Friedman J-A, Evans CA, Bolden AJ and Hryhorczuk C. "The Pipeline Program at the University of Illinois at Chicago College of Dentistry," S120–S134. Available [online](#).
- Hewlett ER, Anderson RM, Atchison KA and Strauss RP. "The Pipeline Program at the University of North Carolina at Chapel Hill School of Dentistry," S135–S147. Available [online](#).
- Atchison KA, Friedman J-A, Freed JR and Jackson D. "The Pipeline Program at the University of Washington School of Dentistry," S148–S160. Available [online](#).
- Friedman JA, Hewlett ER, Atchison KA and Price SS. "The Pipeline Program at West Virginia University School of Dentistry," S161–S174. Available [online](#).

- Crall JJ, Friedman J-A, Atchison KA and Goodacre CJ. "The Pipeline Program at Loma Linda University School of Dentistry," S175–S185. Available [online](#).
- Gift HC, Andersen RM, Davidson PL, Thind A, Yamamoto JM, Maida CA and Marcus M. "The Pipeline Program at the University of California, Los Angeles, School of Dentistry," S186–S198. Available [online](#).
- Hewlett ER, Anderson RM, Atchison KA and Bird W. "The Pipeline Program at the University of California, San Francisco, School of Dentistry," S199–S210. Available [online](#).
- Thind A, Anderson RM, Davidson PL and Glassman P. "The Pipeline Program at the University of the Pacific Arthur A. Dugoni School of Dentistry," S211–S221. Available [online](#).
- Davidson PL, Andersen RM, Thind A, Mulligan R and Nathason N. "The Pipeline Program at the University of Southern California School of Dentistry," S222–S235. Available [online](#).
- Gutierrez JJ, Nakazono TT, Carreon DC and Andersen RM. "Introduction to the Cross-Site Comparisons and Multivariable Analyses of the *Dental Pipeline Program*," S236–S237. Available [online](#).
- Andersen RM, Friedman J-A, Carreon DC, Bai J, Nakazono TT, Afifi A and Gutierrez JJ. "Recruitment and Retention of Underrepresented Minority and Low-Income Dental Students: Effects of the Pipeline Program," S238–S258. Available [online](#).
- Hewlett ER, Davidson PL, Nakazono TT, Carreon DC, Gutierrez JJ and Afifi A. "Revisions to Dental School Curricula: Effects of the Pipeline Program," S259–S268. Available [online](#).
- Atchison KA, Thind A, Nakazono TT, Wong D, Gutierrez JJ, Carreon DC and Anderson RM. "Community-Based Clinical Dental Education: Effects of the Pipeline Program," S269–S282. Available [online](#).
- Davison PL, Nakazono TT, Carreon DC, Bai J and Afifi A. "Practice Plans of Dental School Graduating Seniors: Effects of the Pipeline Program," S283–S296. Available [online](#).
- Thind A, Atchison KA, Nakazono TT, Gutierrez JJ, Carreon DC and Bai J. "Sustainability of Dental School Recruitment, Curriculum, and Community-Based Initiatives," S297–S307. Available [online](#).
- Crall JJ, Davison PL, Nakazono TT, Gutierrez JJ, Bai J and Anderson RM. "Involvement in Health Policy Regarding Oral Health and Dental Education: Effects of the Pipeline Program," S308–S318. Available [online](#).

- Andersen RM, Davidson PL, Atchison KA, Crall JJ, Friedman J-A, Hewlett ER and Thind A. "Summary and Implications of the *Dental Pipeline Program* Evaluation," S319–S330. Available [online](#).
- Kuthy RA, Woolfolk M, Bailit HL, Formicola AJ and D'Abreu KC. "Assessment of the *Dental Pipeline Program* from the External Reviewers and National Program Office," S331–S339. Available [online](#).
- Zamora G and Bau I. "Afterword to the Evaluating the *Dental Pipeline Program* Report: The California *Dental Pipeline Program*, Phase II," S340–S343. Available [online](#).

### **Meetings and Conferences**

Pamela Davidson, Amardeep Thind, Mary Ann Scheirer and Diane M. Manuel, "Using Multiple Methods to Evaluate a National Program to Change Dental Education in the United States," at the American Evaluation Association Annual Conference, November 3, 2004, Atlanta. Abstract available [online](#).

### **SITE STORY LIST**

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### **SIDEBAR LIST**

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