Faculty Development for Underrepresented Minority Dental Faculty and Residents


Abstract: This report describes the implementation and evaluation of the Bronx-Lebanon Hospital Center Dental Faculty Development Program (DFDP) for fifteen participants: five advanced dental education faculty members and ten residents. The 100-hour DFDP, designed in the longitudinal immersion model for faculty development, was conducted in four phases at the Bronx-Lebanon Department of Dentistry in the Bronx, New York, in 2010-11. The DFDP was implemented to help underrepresented minority (URM) dental residents and clinical faculty members develop skills necessary for academic careers and enhanced teaching effectiveness. The program’s curriculum had four themes: teaching and learning, scholarship, academic leadership, and career planning. For each phase, the participants completed pre- and post-training assessments of their knowledge, attitudes, and confidence, as well as qualitative evaluation of DFDP organization, content, activities, and value. The participants’ pre-instruction mean knowledge score for all phases combined was 48.3 percent, and the post-test score was 81.1 percent (p=0.01). The participants showed minimal change in their attitudes about educational issues, but they reported enhanced confidence for twenty-five skills addressed in the DFDP. The total confidence score was 77.5 (25 skills X 3.1 group mean) on all pre-tests combined and 100.2 (25 X 4.0 group mean) on the post-tests (p=0.01). The participant ratings for overall DFDP implementation and for twenty-four topical sessions were uniformly positive. The faculty and resident participants in this year-long faculty development initiative at an advanced dental education program with a high URM representation demonstrated enhanced knowledge and confidence and provided positive program evaluations. This report also describes curricular and assessment enhancements for subsequent years of the DFDP based on the first-year outcomes.

Keywords: academic careers, faculty recruitment, faculty development, clinical education, advanced education in general dentistry, dental education, underrepresented minority faculty

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Faculty development is integral to effective dental education, but dental education is experiencing three challenging phenomena: 1) a decade-long faculty replacement process in which older post-practice dentists are becoming the core of the teaching workforce in the absence of younger dental educators; 2) fewer than 1 percent of graduating dental students who are considering a career in academia; and 3) continuing struggles to attract underrepresented minority (URM) dentists into dental education.1,2 This article reports the program implementation and evaluation of a professional development initiative designed to address these challenges, with focus on preparation for academic careers among URM (African American, Hispanic, or Native American) dentists. Specifically, this article describes the implementation of a longitudinal immersion model for faculty development3-5 to enhance young (ages twenty-six to thirty-four years) URM dental residents’ interest in and readiness for dental education.
education and to reinforce the career choice of URM attending clinical faculty members (ages forty-one to fifty years) with concurrent enrichment of their academic capacities. This initiative, known as the Dental Faculty Development Program (DFDP), is being implemented in advanced dental education programs comprised primarily of URM residents and faculty members serving an ethnically and culturally diverse urban community. The planning, implementation, and preliminary formative assessment of the initial year of the DFDP are reported in this article, along with discussion of lessons learned and program enhancements.

**Dental Education Workforce Trends**

Since 2000, more than 10 percent of dental school faculty members have left academia annually for private dental practice or retirement. Individuals under forty-five years of age represent the largest cohort leaving dental education. The loss of a significant number of early career faculty members is a threat to the vitality of dental education. Departing early- and mid-career dental faculty members are primarily being replaced by first-time recruits into academic dentistry in the fifty to sixty-five years of age range. These individuals are ending their private practice or military dentistry careers and entering the educational environment as a transitional phase before retirement. Although enthusiastic about university life as a change of direction, these older, transitional recruits often have limited teaching experience and minimal exposure to an academic environment. Consequently, new dental school faculty members, although veteran practitioners, frequently need on-the-job training to facilitate transition to the academic setting.

The “aging-up” phenomenon has also contributed to a mentorship gap in dental education. Younger dentists who do enter faculty positions have access to few senior colleagues with the academic experience to function as role models and advisors. In a 2007 study of 1,800 faculty members at fifty U.S. dental schools, lack of mentorship was a major source of dissatisfaction among early-career faculty members and their older second-career colleagues. Professional development support (career planning, mentoring, new faculty orientation, and preparing for the promotion process) was not perceived to be widely available. In addition, there were concerns about quality. Only 42 percent of respondents to a national work-life survey indicated satisfaction with the professional development support available at their institutions.

Lack of access to mentoring and professional development is a particular challenge for URM faculty members. The number of senior, experienced URM faculty members in U.S. dental schools who can serve as inspirations, role models, and career guides for junior colleagues is strikingly small. There have been numerous efforts by individual universities, coalitions of schools, and national programs supported by the American Dental Education Association (ADEA) and private foundations to enhance participation by URM students in dental education and to attract young dentists into academic positions. However, the demographic profile of academic dentistry remains dramatically inconsistent with the evolving ethnic diversity of the United States. Ethnic minorities are expected to comprise more than 50 percent of the U.S. population by 2150. However, only 2,413 (12 percent) of the 20,052 dental students enrolled in U.S. dental schools in 2010 and less than 10 percent of dental faculty members were African American, Hispanic, or Native American. In its 2003 report *National Call to Action to Promote Oral Health*, the U.S. Department of Health and Human Services observed that “the patient pool of any health care provider tends to mirror the provider’s own racial and ethnic background. As such, the provider can play a catalytic role as a community spokesperson, addressing key health problems and service needs.” Specific ethnic groups are also underrepresented in the dental profession. African Americans comprise just 2.2 percent of active dentists versus 12 percent of the population, Hispanics comprise only 2.8 percent of active dentists versus 10.7 percent of the population, and Native Americans comprise 0.2 percent of active dentists versus 0.7 percent of the population.

The U.S. surgeon general’s report *Oral Health in America* noted that oral health problems disproportionately affect URM groups and low-income populations. Enhancement of the number of health care providers who are from URM groups or low-income backgrounds appears to improve access to care for challenged and vulnerable populations.
Attracting Diverse Students to Dental Education

Dental and medical schools in the United States strive to create diversity within their student populations, based on the theory that diversity exposes all students to a broad array of ideas, experiences, and perspectives and prepares them to meet the health care needs of a multicultural American population. Several advocacy papers and research reports have described the educational benefits of student diversity in health professions education. A number of strategies have been implemented to resolve the shortage of URM faculty in academic dental institutions. Most efforts have attempted to increase the number of high school and college URM students who aspire to careers in dentistry. Strategies include proactive promotion of dental careers and specialties at the middle and high school levels, creation of active predental organizations at colleges, prematriculation academic enhancement programs, creation of preprofessional advising and mentoring networks, summer curriculum enrichment and oral health research programs, early admission programs, expanded focus on community-based education and public health, and holistic admissions processes. With financial support from major U.S. foundations, national initiatives have been implemented to increase access to oral health care by increasing the number of URM dental students and practitioners. These initiatives include the Pipeline, Profession, and Practice: Community-Based Dental Education program, the Summer Medical and Dental Education Program, and the Minority Dental Faculty Development Program.

To what extent have efforts to build the URM dental student, practitioner, and academic pipeline been successful? Table 1 compares dental student enrollment and number of graduates for 2000 and 2010. The percentage of African American dental students increased by less than 1 percent from 4.8 percent in 2000 to 5.7 percent in 2010. The percentage of African American graduates increased slightly from 4.5 percent in 2000 to 5.6 percent in 2010. The percentage of Hispanic dental students increased from 5.3 percent in 2000 to 6.3 percent in 2010. The percentage of Hispanic graduates also increased slightly from 5.5 percent in 2000 to 6.0 percent in 2010. The percentages of Native American dental students and graduates were unchanged across the decade. In sheer numbers, 156 more URM students graduated from U.S. dental schools in 2010 in comparison to 2000, a percentage gain of 35 percent, demonstrating that progress has occurred. Even so, expectations for enhanced URM matriculation and graduation rates have not been met. The number of young URM dentists who are candidates for academic positions remains small. As a consequence, the demographics of the dental practitioner and faculty workforces, as well as the dental student population, are not dramatically different than they were in 1975. For example, in that year, 4.4 percent of U.S. dental student graduates were African American, and the percentage increased to only 5.6 percent in 2010.

Alternative Strategy to Diversify Dental Education Workforce

In separate articles, Gates et al. and Haden et al. proposed an alternative strategy for expanding the number of young and URM dentists who see education as a viable career track. This alternative approach uses the advanced dental education environment as a setting for faculty development to achieve three interlinked goals: 1) increase awareness

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<th>Table 1. Numbers of U.S. dental students enrolled and graduated in 2000 and 2010 by ethnicity</th>
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<td>2000</td>
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Note: In the Total column, 654 of the 2,703 gained enrollment were identified as “other/not reported” ethnicity by the American Dental Association; 108 of the gained graduates were also identified as “other/not reported” ethnicity.

of the personal and professional opportunities and rewards associated with academic careers; 2) provide in-training dentists with foundational skills necessary for teaching, scholarship, and career planning; and 3) implement training for the clinical faculty members in residency programs to reinforce their commitment to the educational arena.

Advanced dental education may be fertile ground for the cultivation of interest in academic careers in part because there are higher concentrations of URM residents at this educational level. In 2009-10, URM dentists held 13 percent (792/6095) of all advanced dental education training positions. URM representation was even higher at 17 percent among the dental residencies oriented toward primary care: Advanced Education in General Dentistry (AEGD), General Practice Residency (GPR), and pediatric dentistry programs. The small size of most dental residency programs, interdependence of faculty and residents, and frequent opportunities for communication during the workday provide an environment that lends itself to discussion of career options, including academics. Residents in such settings are also better able to observe and participate in program management and decision making and may be better able to appreciate all facets of a faculty member’s role than in many dental schools where students may primarily encounter clinical faculty as “checkers and graders.” Finally, residents assume teaching, conflict resolution, mentoring, and assessment roles in collaboration with their peers. These roles provide opportunities to promptly use educational strategies that are introduced in faculty development sessions.

The DFDP at the Department of Dentistry at the Bronx-Lebanon Hospital Center (BLHC) in New York City provides a structured year-long introduction to the academic careers and skills necessary for success in educational roles for residents in GPR and pediatric dentistry residency programs and also supports the enhancement of skills in teaching, educational leadership, scholarship, and career planning that are immediately useful to attending faculty members in these residency programs, with the goal of reinforcing commitment to the academic career track. Accordingly, the objectives of this report of a program implementation and evaluation are to 1) describe a longitudinal, immersion model for implementing a faculty development program that addresses the needs and interests of both future dental educators (residents-in-training ages twenty-six to thirty-four years) and current advanced education faculty members (ages forty-one to fifty years) within an urban hospital-based dentistry program where both groups of trainees are primarily members of URM groups; 2) communicate the program content and participants’ learning activities; 3) share outcomes of the formative assessment of the first year of the DFDP; and 4) discuss modifications for subsequent iterations of the DFDP based on lessons learned from the initial roll-out and formative assessment. The Institutional Review Board at the Bronx-Lebanon Hospital Center reviewed and approved the data collection protocol employed in the program evaluation for the DFDP (Bronx-Lebanon Hospital Center IRB Protocol # 05101204).

Design and Implementation of the DFDP

The BLHC Department of Dentistry is located in an urban environment (Borough of Bronx, New York City) that is a federally designated Health Professionals Shortage Area (HPSA) and which struggles with significant economic, educational, infrastructure, and public health challenges including substantial oral health morbidity for adults, adolescents, and children. The Department of Dentistry is comprised of a GPR program that has been in operation since 1948 and a pediatric dental residency program that has operated since 2001. The first author has served as the director of the BLHC Department of Dentistry since 1990. The department has historically demonstrated a capacity to recruit and retain URM faculty members and residents. Among the thirty-four faculty members currently in the dental department, twenty-three (68 percent) are members of URM groups. Among the forty-six residents in 2010-11, twenty-two (48 percent) were from URM groups. Among the forty-six residents in 2010-11, twenty-two (48 percent) were from URM groups.

The DFDP is one component of the overall faculty development initiative at the BLHC Department of Dentistry. Supported by a 2010 grant from the U.S. Health Resources and Services Administration (HRSA) for faculty development training in general, pediatric, and public health dentistry, the DFDP initiative has three foci: 1) a year-long DFDP for ten residents and five faculty members annually that is described in this article; 2) acquisition of clinical and translational research skills by means of a Master of
Public Health program at Yeshiva University for two faculty members or residents; and 3) completion of an online certificate in medical education through the Cincinnati Children’s Hospital Medical Center by three faculty members or residents. Components 2 and 3 are not described here.

The DFDP is a four-phase program comprising twelve days of seminars (three days per phase at seven contact hours per day) plus three between-phase reinforcement webinars of two hours each and requiring three hours’ preparation per webinar, for a total of 100 contact hours annually. In 2010-11, the three-day phases were conducted onsite at the BLHC Department of Dentistry in November, February, April, and June on three consecutive days each month: Wednesday, Thursday, and Friday. Each seminar day commenced at 8:00 am and concluded at 4:30 pm with a lunch break at noon and fifteen-minute breaks in the morning and afternoon. The department chairman and training grant principal investigator (PI) arranged for clinic coverage for both residents and attending faculty members to facilitate their participation in the DFDP seminars. Year 1 (2010-11) was conducted in an eight-month period (November 2010 to June 2011) due to the timing of the funding notification, while subsequent years will be conducted over a twelve-month period.

The BLHC Department of Dentistry contracted with the Academy for Academic Leadership (AAL) to conduct the DFDP in conjunction with departmental faculty members. Dental education is one of AAL’s primary areas for faculty development, including the ADEA/AAL Institute for Teaching and Learning and Institute for Allied Health Educators, both conducted in collaboration with ADEA, and the ADEA Leadership Institute directed by coauthor Haden. These programs, along with AAL’s interprofessional Chairs and Academic Administrators Management Program (CAAMP) and the COMPASS Program for new faculty, collectively provide professional development for approximately 250 health professions educators annually. The coauthors of this article were the instructors in the 2010-11 DFDP. Collectively, these individuals have participated as project directors, curriculum planners, and instructors in more than thirty health provider/educator training and/or educational innovation grants funded by HRSA, the National Institutes of Health, or major foundations, including HRSA URM Center of Excellence grants at multiple dental schools and several primary care in dentistry faculty development grants, in addition to the HRSA-funded DFDP described in this article.

**Theoretical Framework for DFDP**

The theoretical framework and implementation model of the DFDP is based on best practice evidence from the faculty development literature. A comprehensive review of more than 300 studies of the effectiveness of faculty development in health professions education by Steinart et al. found that longitudinal immersion programs are the most likely to enhance knowledge and confidence and promote incorporation of newly acquired skills into teaching practice. This type of program establishes cohorts of trainees who remain together for an extended period of time, thus building group identity/rappor, and who experience an intensive program that employs active learning, collaborative team projects, teaching simulations, and peer feedback. The longitudinal immersion model that served as the design framework for the DFDP has the following attributes, which have been endorsed as best practices for academic skill enhancement programs: frequent multi-day meetings of a core group of participants and instructor/facilitators with activities to cultivate group identity and allegiance; use of experiential learning, including hands-on practice of skills, case, and situational analysis; role-play of student-teacher interactions with group debriefing afterward; provision of feedback to participants about their performance during academic tasks; participant self-assessment; use of peers to model exemplary teaching behaviors and share perspectives on teaching; activities that facilitate peer interaction and the building of colleague relationships; and diverse types of learning experiences.

Steinart et al. reported that faculty development programs with these characteristics were likely to achieve the following outcomes: high levels of participant satisfaction with faculty development programs; programs with a practical and skills-based focus are most valued; positive participant attitudes toward faculty development and teaching as a career focus; increased participant knowledge of educational concepts and specific teaching strategies; course instructors, professional peers, and students reported enhancements in participants’ teaching behaviors; enhanced participant confidence in ability to implement recommended teaching strategies; increased participant involvement in new educational activities; and participants establishing new or expanded networks of colleagues within the academic arms of their professions. The design of the DFDP was also informed by the increasingly robust faculty development literature in dental education that has included,
in recent years, important contributions by O’Neill and Taylor,56 Licari,57 Farmer,58 Dalrymple et al.,59-61 McAndrew,62 Hand,63 and Haden et al.64-66 describing, respectively, desirable program characteristics and contemporary practices, models to enhance faculty skills in specific tasks such as facilitation of problem-based learning, active learning approaches for faculty development, competencies that should comprise the targeted outcomes of these training initiatives, and descriptions of program format and heuristics.

Conducting needs assessment prior to faculty development has been found to result in programs that are more likely to be attended and evaluated positively and to have contained skills perceived to be transferable to the day-to-day work responsibilities of faculty.5,42,43 Accordingly, the topics for the 2010-11 DFDP were identified through the use of a Professional Needs Assessment (PNA) survey,7 which has been employed in previous faculty development initiatives. On the PNA, BLHC Department of Dentistry faculty members and residents indicated their interests and perceived need for training related to the following: instructional design and curriculum planning, teaching and learning strategies, assessing and helping struggling residents, resident assessment, resident assessment, scholarship, academic leadership, educational environment, and career planning.

DFDP Participants

There were fifteen participants in the 2010-11 DFDP: five faculty members and ten residents. Seven residents were in the GPR program, and three were in the pediatric dentistry residency. Four of the five faculty members and seven of the ten residents were female, for a total of eleven female and four male participants. Five of the residents were between twenty-six and thirty years of age, and five were between thirty-one and thirty-four years. Among the faculty members, two were between thirty-one and thirty-five years of age, and three were between forty-one and fifty years. The attending faculty members averaged seven years of teaching experience. The ethnicity of the training group was as follows: four (three residents and one faculty member) Southeast Asian/Pacific Rim, two (both residents) Caucasian, eight (five residents and three faculty members) African American, and one (a faculty member) Hispanic. Overall, eight of the ten residents were members of URM groups, and the five faculty members were URM (13/15; 87 percent). Faculty members were selected for the DFDP based on their leadership roles in the residency programs and their expression of interest in participation. Residents were selected for the DFDP based on their program leadership roles (i.e., serving as chief residents) and their expressed desire to participate.

DFDP Themes and Curriculum

The DFDP was structured around four themes identified during the needs assessment:

1. **Teaching and learning:** develop the teaching, assessment, and curriculum planning skills of participants and enhance understanding of factors that influence learning within dental education programs;

2. **Scholarship:** develop participants’ capacity to engage in scholarship pertinent to educational issues and methods;

3. **Educational leadership:** develop participants’ capacity to function as academic leaders; and

4. **Career development:** enhance the academic career planning skills of DFDP participants.

Topics within each of these themes were addressed during each of the four DFDP phases to emphasize the interplay of these important components of academic life and provide variety for the participants. The DFDP addressed a variety of objectives and topics, including educational principles and techniques, learner characteristics and learning pathologies, personality and learning styles, instructional design, assessment of progress toward competence, working with struggling students, analyzing academic culture, educational leadership, teaching styles and roles, legal issues in health professions education, career planning, and scholarships skills (Table 2).

The 2010-11 DFDP curriculum is shown in Table 3. Each of the three-day phases was comprised of two half-day sessions devoted to specific topics at 3.5 hours per topic to provide time for an overview, hands-on practice, self-assessment or issue discussion, and capstone task. Overall, the longitudinal immersion model of the DFDP provided participating residents and faculty members with twenty-four focused learning experiences over the course of the year (4 phases x 3 days each x 2 topical sessions each). DFDP participants experienced a variety of the following learning activities: assessments pertinent to teaching, career goals, personality, learning styles, leadership, and educational environment; team projects and reports; teaching simulations involving role-play; classroom mini-lectures by each participant that were critiqued by peers; teaching clinical skills to other participants; critiques of other
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<th>Theme</th>
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| Teaching and Learning | Enhance capacity to guide residents’ learning, create a positive learning environment, provide coaching and mentoring, and assess trainees’ acquisition of competence. | • Instructional design  
• Contemporary curriculum models  
• Learning styles and personality  
• Case-based, problem-centered learning  
• Dealing with struggling learners  
• Assessment of comprehension  
• Assessment of clinical performance  
• Teaching in classroom, lab, and clinic |
| Scholarship           | Enhance capacity to participate in scholarship pertaining to teaching and learning and educational processes. | • Scientific writing  
• Principles of research design  
• Writing abstracts  
• Writing grant applications |
| Academic Leadership   | Enhance capacity to function in leadership roles in the academic setting. | • Analyzing how personality influences interactions with others  
• Models of leadership and leadership style  
• Resolving conflict and negotiation  
• Legal issues in education  
• Conducting effective meetings |
| Career Development    | Enhance capacity to set career goals and develop plans to accomplish these goals. | • Career goals and career planning  
• Assessing professional development needs  
• Obtaining work-life balance  
• Analyzing case studies of faculty careers |

Table 3. 2010-11 DFDP curriculum (each phase three days at seven hours per day)

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<tr>
<th>Phase</th>
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| November 2010 | 1. Instructional design and course planning  
2. Assessing comprehension with written tests  
3. Influence of personality on teaching, learning, and leadership: Myers-Briggs Type Indicator  
4. Building academic careers  
5. Clinical teaching strategies  
6. Academic leadership: conflict management and negotiation |
| February 2011 | 1. Struggling residents and sources of learning difficulty  
2. Exemplary leadership practices  
3. Career goals and work-life balance  
4. Scientific writing/writing abstracts  
5. Principles of research design  
6. Teaching psychomotor and other clinical skills |
| April 2011   | 1. Learning and teaching styles  
2. Conducting effective meetings and chairing committees  
3. Leadership: understanding emotional intelligence  
4. Assessing residents’ clinical performance  
5. Legal issues in the educational environment  
6. Case-based, problem-centered learning |
| June 2011    | 1. Leadership: guiding change in an organization  
2. Strategies for difficult, distressed, or disordered students  
3. Models of education and curriculum  
4. Writing grant applications  
5. Evaluating performance in residency programs  
6. Managing up the administrative ladder |
teachers’ interactions with students and residents (observed on videotape); analysis of cases depicting teacher-student interactions; analysis of leadership and teamwork scenarios; reviews (team critiques) of abstracts, manuscripts, and grants; team writing projects pertinent to dissemination of scholarship; and analyses of their own residency program based on concepts introduced during the DFDP.

Capstone Tasks and Between-Phase Activities

Working individually or in teams, the participants performed twenty-four capstone tasks (approximately one for each DFDP session) that are central to the teaching responsibilities and other roles of academic dentists. Table 4 shows the academic capstone tasks performed. The participants received feedback on these tasks from DFDP instructors and from their peers. DFDP participants received a bound manual for each phase that included handouts, reprints, worksheets, cases, and a bibliography of key readings in the dental education and teaching/learning literature.

DFDP participants also completed the following transitional activities between phases for reinforcement of concepts and to provide opportunities to use and reflect upon topics and skills introduced in the preceding phase: interactive webinars, readings pertinent to topics in the upcoming phase, and various types of self-assessment inventories pertaining to personality, teaching, leadership, and collaborative style. For each of the webinars, five designated participants each identified a topic/skill from the preceding phase that was particularly meaningful for him or her and developed PowerPoint presentations, which were presented to the whole group including instructors at their home institutions via web conferencing. In these presentations, the participants described the ways that the topic/skill had been or could be applied and implications of the topic/skill for the residency program, discussed personal reflections about the value of the material, and communicated additional information about the topic/skill based on their own research. DFDP instructors provided constructive feedback to each presenter and provided additional insights. The participants provided each other with feedback guided by a worksheet and discussed issues raised in the presentations. During the year, all fifteen participating faculty members and residents developed and conducted a webinar.

Table 4. Capstone tasks performed by DFDP participants

| 1. Write competency statements and learning objectives. |
| 2. Develop a course plan. |
| 3. Take a written test, and identify test construction errors. |
| 4. Write well-constructed test questions in several formats. |
| 5. Develop a case-based examination in the National Board Dental Examination format. |
| 6. Write cases that can be used for teaching, and lead a case-based seminar. |
| 7. Assess other dental teachers (shown on videotape and during role-play simulations) to identify effective and ineffective teaching. |
| 8. Give constructive feedback in a teaching simulation. |
| 9. Self-assess the performance evaluation system in their own residency program. |
| 10. Design a system to measure trainee performance. |
| 11. Analyze cases of struggling residents, and propose strategies to help these individuals. |
| 12. Conduct a performance evaluation meeting with a resident or faculty member. |
| 13. Chair a committee meeting. |
| 14. Develop a career plan. |
| 15. Complete and analyze a personality inventory and a learning styles inventory. |
| 16. Complete a leadership inventory, and self-assess leadership style. |
| 17. Develop a plan for work-life balance. |
| 18. Analyze scenarios of academic leadership issues and propose solutions. |
| 19. Critique a manuscript reporting educational research. |
| 20. Design an educational research study. |
| 21. Write an abstract for a manuscript. |
| 22. Write a grant application and receive a critique. |
| 23. Present a 10-minute lecture during one of the DFDP phases and receive critiques. |
| 24. Develop and conduct a 20-minute web conference and receive critiques. |
Program Evaluation

Evaluation of the DFDP included summative (final outcomes) and formative (evaluation to guide program refinements) components. The program evaluation and statistical analysis of data were provided by independent consultants who are not employees of the BLHC Department of Dentistry. The ultimate summative outcome goals of the HRSA funding initiative that supports the DFDP are the following: 1) to increase the number of young, early career dentists who seek and obtain faculty positions in dental education, with focus on URM dentists for reasons discussed in the introduction section; and 2) to reinforce the desire of current dental faculty members to remain within the educational arm of the profession and enhance their capacity to move into leadership positions. The summative data points for the DFDP are the following: 1) the percentage of BLHC dental residents-in-training who participated in the DFDP and secured faculty positions in either predoctoral or advanced dental education relatively early in their professional careers (for example, prior to age forty); and 2) the percentage of BLHC dental faculty members who participated in the DFDP and remained in academic dentistry with tracking of their career progress over time. Evaluation of the degree to which these long-term outcomes are attained will involve tracking of the DFDP participants after program completion. Preliminary data will not be available for several years.

The formative component of the program evaluation included data collection to guide the design of future iterations of the program, provide quality improvement, and maximize the meaningfulness of the DFDP for residents and faculty members. The outcomes of the year one formative assessment are reported here to provide background for program enhancements that will be incorporated into the DFDP in subsequent years and to provide guidance for other institutions considering faculty development programs with goals similar to the DFDP.

Four data sources were used to facilitate ongoing monitoring of program quality: 1) analysis of the outcomes of the pre- and post-training testing; 2) review of the participants’ qualitative appraisal of program implementation, organization, content, learning activities, and instructors; 3) appraisal of issues, concerns, and recommendations identified during an end-of-program focus group conducted at the conclusion of DFDP phase 4 with participating dental faculty and residents; and 4) an annual program review with participation by the PI, other Department of Dentistry faculty members, administrative staff involved in the DFDP, the program evaluator for the HRSA grant, and educational consultants who assisted with program implementation.

An evaluation was conducted at the conclusion of each phase and of the entire program. Participants completed pre- and post-phase assessments in the KACE (Knowledge, Attitudes, Confidence, Evaluation) format. The pre and post questionnaires consisted of one-best-response multiple-choice questions to assess knowledge of concepts addressed during each phase, an inventory of attitudes pertinent to topics and issues, a scale that requested self-assessment of confidence pertinent to capstone tasks, and for the post-phase questionnaire, an evaluation of the overall DFDP focus on organization, usefulness of educational materials, quality of learning experiences, knowledge and helpfulness of instructors, and usefulness of each half-day topic. All faculty and resident participants were expected and encouraged to complete pre and post assessments for purposes of the submission of complete progress reports to HRSA.

Following each webinar, the participants evaluated the organization, quality of learning experiences, and perceived value of the presentations. A large group debriefing, in focus group format, of the residents and faculty members occurred at the end of DFDP phase 4 to elicit perceptions of the extent to which the program met expectations, identify strengths and weaknesses, and pinpoint enhancements for subsequent years. The debriefing was conducted by an educational consultant rather than by the PI or other Department of Dentistry faculty members to promote candor. All of the preceding information was analyzed during the year-end review.

The knowledge, attitudes, and confidence items for the pre and post formative assessments were developed by the DFDP instructors responsible for the sessions associated with each item. All pre- and posttest items were collectively reviewed by the coauthors, with modifications based on these critiques. The pre- and posttests were not pilot tested for purposes of validation prior to use in the DFDP. Cronbach’s coefficient alpha, a statistical measure of reliability, was used to analyze the consistency of items within the knowledge, attitudes, and confidence components (extent to which items within a scale measure the dimension represented by the entire scale; i.e., item-to-scale consistency) for the phase 2, 3, and 4 administrations during the DFDP. Item-to-scale consistency was 0.71 for knowledge,
0.81 for attitude, and 0.93 for confidence, representing acceptable instrument reliability and indicating that the individual items within each pre-/posttest component were largely sampling an intact domain related to academic skills.

Results

During the 2010-11 DFDP, pre- to post-program changes in the participants’ knowledge of key concepts for each topic, attitudes, and confidence were assessed for phases 2, 3, and 4 to assist DFDP instructors in analyzing and modifying their sessions for future years of the program. Due to the rapid startup of the DFDP subsequent to the award announcement, knowledge, attitudes, and confidence were not measured for phase 1. Thus, some objectives and topics identified in Table 2 were not included in the 2010-11 DFDP assessment. Pre- and posttest responses for the knowledge questions, attitude items, and confidence ratings for phases 2, 3, and 4 were entered into Excel files and then imported into IBM SPSS statistical software version 19 (IBM SPSS, Armonk, NY). Pre- and posttest data and calculated total scores were merged by summing across variables at each time period (i.e., pre and post for each phase). Composite scores for all faculty members and residents combined are reported because there was virtually no difference in knowledge, attitudes, and confidence scores between the five faculty members and ten residents and also in consideration of the small number of respondents in each group, which made statistical comparison between groups problematic. Because of the small sample size, the nonparametric Mann-Whitney U statistic was used to compare pre- and posttest scores.

For the first component of the KACE assessment—knowledge of key concepts—the participants completed a twelve-item written assessment in a multiple-choice response format immediately prior to the first session in phases 2, 3, and 4 and immediately after the concluding session in each phase. Pre- and posttests were distributed in paper format by the course instructors to the DFDP participants, who circled responses on the assessment form. Questions were derived from the learning objectives of each DFDP session, with allocation of two questions per topic. For the topic Designing Educational Research in phase 2, for example, this question appeared on the pre- and posttests: “In research, factors and conditions that are determined, selected, or manipulated by the investigators are known as: A) dependent variables, B) independent variables; C) intervening variables; D) surrogate variables.” For the topic Assessing Residents’ Clinical Performance in phase 3, this question appeared on the pre- and posttests: “Which of the following represents an appropriate assessment for Miller’s ‘Knows How’ level of learning? A) Faculty observation and rating of student/resident performance in the clinic; B) An OSCE with standardized patients; C) Triple Jump or work portfolio; D) Essays or oral exams; E) Multiple choice (one best response) exams.”

The preinstruction mean knowledge score for residents and faculty members combined for phases 2, 3, and 4 was 17.4/36 (48.3 percent), and the posttest score was 29.2/36 (81.1 percent), which represented a statistically significant difference at 0.01. Table 5 shows descriptive statistics for pre- and posttest scores for all participants combined for phases 2, 3, and 4 and overall.

The second assessment component measured participants’ attitudes about educational issues and techniques, academic leadership, scholarship, and career development. Participants responded to ten attitudinal statements immediately prior to the first session in phases 2, 3, and 4 and to the same items immediately after the concluding session in each phase. Pre- to post-program changes in the participants’ attitudes were assessed in a ten-item written assessment immediately prior to the first session in phases 2, 3, and 4 and immediately after the concluding session in each phase. Pre- and posttest data and calculated total scores were merged by summing across variables at each time period (i.e., pre and post for each phase). Composite scores for all faculty members and residents combined are reported because there was virtually no difference in knowledge, attitudes, and confidence scores between the five faculty members and ten residents and also in consideration of the small number of respondents in each group, which made statistical comparison between groups problematic. Because of the small sample size, the nonparametric Mann-Whitney U statistic was used to compare pre- and posttest scores.

For the second component of the KACE assessment—attitudes about educational issues and techniques—the participants completed a ten-item written assessment in a multiple-choice response format immediately prior to the first session in phases 2, 3, and 4 and immediately after the concluding session in each phase. Pre- and posttests were distributed in paper format by the course instructors to the DFDP participants, who circled responses on the assessment form. Questions were derived from the learning objectives of each DFDP session, with allocation of two questions per topic. For the topic Designing Educational Research in phase 2, for example, this question appeared on the pre- and posttests: “In research, factors and conditions that are determined, selected, or manipulated by the investigators are known as: A) dependent variables, B) independent variables; C) intervening variables; D) surrogate variables.” For the topic Assessing Residents’ Clinical Performance in phase 3, this question appeared on the pre- and posttests: “Which of the following represents an appropriate assessment for Miller’s ‘Knows How’ level of learning? A) Faculty observation and rating of student/resident performance in the clinic; B) An OSCE with standardized patients; C) Triple Jump or work portfolio; D) Essays or oral exams; E) Multiple choice (one best response) exams.”

The preinstruction mean knowledge score for residents and faculty members combined for phases 2, 3, and 4 was 17.4/36 (48.3 percent), and the posttest score was 29.2/36 (81.1 percent), which represented a statistically significant difference at 0.01. Table 5 shows descriptive statistics for pre- and posttest scores for all participants combined for phases 2, 3, and 4 and overall.

Table 5. Descriptive statistics for pre- and posttest knowledge scores for all DFDP participants combined for phases 2, 3, and 4 and overall

<table>
<thead>
<tr>
<th></th>
<th>Pre-Program</th>
<th>Post-Program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Participants</td>
<td>(5 faculty, 10 residents)</td>
</tr>
<tr>
<td></td>
<td>Mean Number Correct</td>
<td>Percent Correct</td>
</tr>
<tr>
<td>Phase 2</td>
<td>6.6/12</td>
<td>55.3%</td>
</tr>
<tr>
<td>Phase 3</td>
<td>6.7/12</td>
<td>55.6%</td>
</tr>
<tr>
<td>Phase 4</td>
<td>4.1/12</td>
<td>34.2%</td>
</tr>
<tr>
<td>Overall</td>
<td>17.4/36</td>
<td>48.3%</td>
</tr>
</tbody>
</table>
phase in a paper-pencil format. Items were presented as either positive statements, such as “It is important for developing academic leaders to get feedback from colleagues,” or as negative statements, such as “During residency, the focus should be on refining clinical skills; learning about teaching strategies is not important.” The response options and associated numerical point values for scoring and statistical analyses were as follows: strongly disagree (1 point), disagree (2), uncertain (3), agree (4), and strongly agree (5). The following are examples of items included in the attitudinal assessment. In phase 2 (theme: Teaching and Learning), “It is the responsibility of the faculty to deal with residents who are struggling; other residents should not get involved”; in phase 3 (theme: Academic Leadership), “Effective meeting results depend on achieving consensus”; and in phase 4 (theme: Academic Careers), “Rational argument is the only acceptable way to influence those above me in the organization.”

The total pre- and posttest scores for faculty members and residents across thirty items that addressed attitudes about educational techniques, academic leadership, scholarship, and career development were not significantly different. Significant changes between pre- and post-program responses were identified for only three of the thirty attitudinal statements. These three items addressed teaching clinical skills, use of standardized evaluations, and strategies for influencing administrators. However, readers are cautioned that analysis of score changes for individual items on a scale with a small sample size can be misleading.

The third assessment measured participants’ confidence in using the skills and concepts emphasized in the DFDP. Participants responded to a series of confidence statements immediately prior to the first session in phases 2, 3, and 4 and immediately after the concluding session in each phase in a format in which they circled responses on the assessment form. There were a total of twenty-five confidence statements across the three phases. The response options and numerical point values for scoring and statistical analyses were as follows: not at all confident (1 point), not confident (2), moderately confident (3), confident (4), and very confident (5). Confidence statements were derived from the learning objectives of the DFDP sessions and were linked to the capstone activities. The following are examples of items included in the confidence assessment: phase 2 (theme: Academic Leadership), “Spot behaviors that impede good teamwork”; in phase 3 (theme: Teaching and Learning), “Write cases in a problem-based learning (PBL) format”; and in phase 4 (theme: Academic Careers), “Determine the best strategy for influencing someone above me in the organizational hierarchy.”

Table 6 shows descriptive statistics for pre and post responses to confidence items for faculty members and residents combined. The total confidence score on the pretest was 77.5 (twenty-five items x 3.1 group mean) and 100.2 (twenty-five items x 4.0 group mean) on the posttest, which represented a statistically significant difference at 0.01.

Residents and faculty members evaluated the implementation and perceived value of the program at the conclusion of each phase. Participants responded with a scale and point values consisting of strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). Participants also rated the quality of each of the half-day sessions using a scale and point values consisting of not useful at all (1), poor (2), fair/okay (3), good (4), and excellent (5). Table 7 shows the participants’ ratings of program implementation, and Table 8 shows their ratings of each of the twenty-four half-day educational sessions. As shown in these tables, ratings for overall DFDP implementation and for specific topical sessions were uniformly positive. The phase 4 evaluation also included two questions to elicit perceptions of the overall four-phase DFDP. For the statement “The Dental Faculty Development Program helped my understanding of teaching, leadership, research, and career planning,” the mean rating was 5.00; all participants strongly agreed. The second overall assessment statement was “I am glad I participated in the Dental Faculty Development Program.” The mean rating for this item was 4.96.

**Limitations**

The implementation of the DFDP reflects the strategies employed at a single residency training site and thus may not generalize to, or be completely feasible at, other sites operating under different priorities, circumstances, or constraints. The formative assessment of the DFDP was based upon data and analyses from a single year of implementation for a unique set of faculty members and residents that also may not generalize to other advanced dental education settings or other training participants. As with all efforts to obtain qualitative appraisals of program effectiveness, meaningfulness, and value from trainees, a social desirability bias may skew ratings
of training components, often in a positive direction (i.e., responding in a manner that will be viewed favorably by others, such as the DFDP instructors). 56

Given the scope of the project and the challenge and controversies in implementing methods that accurately assess and correct for such potential response bias, no effort was made to assess or account for social desirability bias, which may represent a limitation. As with any survey-derived data, readers are encouraged to consider the program evaluation data in light of this phenomenon. The end-of-year focus group was implemented, in part, as a counterbalance to the participants’ qualitative ratings and to obtain other perspectives not expressed elsewhere in the formative assessment process. Without either an active or passive control group of faculty members and residents completing the same pre- and post-training assessments, it cannot be conclusively determined if the gains in knowledge, attitudes, and confidence were a result of the DFDP experience or a consequence of other factors. The geographic dispersal of the GPR and pediatric dentistry clinics at numerous sites throughout metropolitan New York was a barrier to the creation of a control group during the start-up year. The investigators are considering ways to establish a control group for future iterations.

### Discussion

John et al. described strategies to enhance the attractiveness of academic careers for dentists and reviewed programs that may increase the retention of current faculty members. 57 Those authors concluded that the dental education community needs to be more proactive in “growing and cultivating our own” rather than relying on practitioners seeking a career transition. The DFDP in the Department of Dentistry at Bronx-Lebanon Hospital Center is
an effort to “grow our own” within the context of advanced dental education, with focus on establishing an alternative strategy for orienting URM residents-in-training and their supervising faculty members to academic careers, building interest in teaching and scholarship, and enhancing readiness for work in the educational arm of the profession. For the participating residents, aspects of the DFDP were similar to the Residents as Teachers Programs (known as RAsT or RATs programs). Post et al. reviewed the outcomes of RAsT programs and concluded that residents-as-teachers curricula

Table 7. Participants’ agreement with statements about DFDP program implementation (scale from 1=strongly disagree to 5=strongly agree)

<table>
<thead>
<tr>
<th>Item</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>This phase was well organized.</td>
<td>4.93</td>
<td>4.86</td>
<td>4.77</td>
<td>4.85</td>
<td>4.85</td>
</tr>
<tr>
<td>Handout materials were useful.</td>
<td>4.93</td>
<td>4.71</td>
<td>4.92</td>
<td>4.92</td>
<td>4.87</td>
</tr>
<tr>
<td>Faculty members were helpful and knowledgeable.</td>
<td>5.00</td>
<td>4.93</td>
<td>4.92</td>
<td>5.00</td>
<td>4.96</td>
</tr>
<tr>
<td>I am glad I participated in this DFDP phase.</td>
<td>5.00</td>
<td>5.00</td>
<td>4.92</td>
<td>4.92</td>
<td>4.96</td>
</tr>
<tr>
<td>Overall mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.91</td>
</tr>
</tbody>
</table>

Table 8. Participants’ ratings of each DFDP educational session (scale from 1=not useful at all to 5=excellent)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td></td>
</tr>
<tr>
<td>Instructional Design and Course Planning</td>
<td>4.86</td>
</tr>
<tr>
<td>Assessing Comprehension with Written Tests</td>
<td>4.73</td>
</tr>
<tr>
<td>Influence of Personality on Teaching, Learning, and Leadership: Myers-Briggs Type Indicator</td>
<td>4.86</td>
</tr>
<tr>
<td>Building Academic Careers</td>
<td>4.73</td>
</tr>
<tr>
<td>Clinical Teaching Strategies</td>
<td>5.00</td>
</tr>
<tr>
<td>Academic Leadership: Conflict Management and Negotiation</td>
<td>4.80</td>
</tr>
<tr>
<td>Phase 1 Mean</td>
<td>4.83</td>
</tr>
<tr>
<td>Phase 2</td>
<td></td>
</tr>
<tr>
<td>Helping Residents Who Are Struggling</td>
<td>4.93</td>
</tr>
<tr>
<td>Exemplary Leadership Practices</td>
<td>4.71</td>
</tr>
<tr>
<td>Career Goals and Work-Life Balance</td>
<td>4.50</td>
</tr>
<tr>
<td>Getting Started with Scholarship and Writing Abstracts</td>
<td>4.57</td>
</tr>
<tr>
<td>Designing Educational Research</td>
<td>4.86</td>
</tr>
<tr>
<td>Teaching Psychomotor and Other Clinical Skills</td>
<td>5.00</td>
</tr>
<tr>
<td>Phase 2 Mean</td>
<td>4.76</td>
</tr>
<tr>
<td>Phase 3</td>
<td></td>
</tr>
<tr>
<td>Learning and Teaching Styles</td>
<td>5.00</td>
</tr>
<tr>
<td>Conducting Effective Meetings and Chairing Committees</td>
<td>4.61</td>
</tr>
<tr>
<td>Leadership: Understanding Emotional Intelligence</td>
<td>4.77</td>
</tr>
<tr>
<td>Assessing Residents’ Clinical Performance</td>
<td>4.69</td>
</tr>
<tr>
<td>Legal Issues in the Educational Environment</td>
<td>4.92</td>
</tr>
<tr>
<td>Case-Based, Problem-Centered Learning</td>
<td>5.00</td>
</tr>
<tr>
<td>Phase 3 Mean</td>
<td>4.83</td>
</tr>
<tr>
<td>Phase 4</td>
<td></td>
</tr>
<tr>
<td>Leadership: Guiding Change in an Organization</td>
<td>4.54</td>
</tr>
<tr>
<td>Strategies for Difficult, Distressed, or Disordered Students</td>
<td>4.85</td>
</tr>
<tr>
<td>Models of Education and Curriculum</td>
<td>4.75</td>
</tr>
<tr>
<td>Writing Grant Applications</td>
<td>4.55</td>
</tr>
<tr>
<td>Evaluating Performance in Residency Programs</td>
<td>4.92</td>
</tr>
<tr>
<td>Managing Up the Administrative Ladder</td>
<td>4.69</td>
</tr>
<tr>
<td>Phase 4 Mean</td>
<td>4.72</td>
</tr>
</tbody>
</table>
can significantly improve residents’ teaching skills, especially related to clinical precepting. The formative assessment outcomes of DFDP year 1 for GPR and pediatric dentistry residents, including their qualitative appraisal of the program, are consistent with findings reported by Post et al., but will need to be sustained as the program evolves. For the faculty members participating in the DFDP, the results of the formative assessment are also consistent with the prototypical findings reported for faculty development implemented via the longitudinal immersion model.  

**DFDP Enhancements Based on Program Evaluation**

For the first DFDP year, emphasis was placed on needs assessment, planning, initial rollout of the curriculum, and appraisal of the suitability of topics and course format. Based on review of the formative assessment, several enhancements are planned for subsequent years.

**Enhancements to the curriculum.** DFDP participants recommended expansion of focus on leadership of advanced education programs as well as general educational management skills. These include interviewing and hiring faculty and staff, more focus on conflict resolution and negotiation, career-building activities to position oneself for attending faculty or program director positions, expanded discussion of legal issues in the educational setting, and inclusion of seminars that focus on academic career-building strategies for URM faculty members. Year 2 of the DFDP, currently in progress, has been modified to include augmented activities for these topics.

**Enhancements to outcome assessment.** For DFDP year 2, outcome assessment has been strengthened by more frequent appraisal of teaching behaviors exhibited by course participants during structured simulations. An objective structured teaching examination (OSTE), a station exam that measures ability to use educational best practices, will be implemented in future years of the DFDP at the start of phase 1 and at the end of phase 4 to measure changes in participants’ capacity to use skills emphasized in the DFDP. McAndrew et al. have recently developed an OSTE specifically linked to teaching skills pertinent to dental education. A future goal is to conduct teaching observations in the clinic to reinforce the DFDP seminars. Additionally, pre- and posttests are now administered online to enhance efficiency.

**Modification of the pre- and posttests.** Many of the attitude items in the pre and post formative assessments were apparently tapping into general perspectives about teaching and academic careers already held by participants. For subsequent iterations of the DFDP, attitudinal items will focus on interest in teaching as a career, awareness of options within academe, intentions to seek teaching positions, and intentions to use acquired DFDP skills during the residency program and in future employment.

**Conclusions**

Fifteen primarily URM residents and attending faculty members (13/15; 87 percent) at a dental residency program located in a historically underserved urban community in the Bronx, New York, completed a year-long academic career development program known as the Dental Faculty Development Program (DFDP). The DFDP was implemented as an alternative strategy for promoting interest in academic careers among young URM dentists and developing skills needed for entry into the dental education job market. The program evaluation found that DFDP participants demonstrated enhanced knowledge and confidence for a wide range of academic skills in the realms of learning theory, teaching strategies, curriculum design, assessment of students’ learning, educational leadership, scholarship, and career development. Residents and faculty members provided positive evaluations of DFDP content, structure, and learning experiences. The program evaluation identified ways to enhance the DFDP, including an OSTE, additional academic leadership and career-building seminars, and revision of the attitude items on the pre- and posttests. Hopefully, the DFDP design and outcomes of the formative assessment will provide guidance for other dental education programs that desire to implement faculty development with a focus on academic career readiness for URM dentists.

**Acknowledgments**

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