

# Mentoring Programs for Underrepresented Minority Faculty in Academic Medical Centers: A Systematic Review of the Literature

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## Abstract

### Purpose

Mentoring is critical for career advancement in academic medicine. However, underrepresented minority (URM) faculty often receive less mentoring than their nonminority peers. The authors conducted a comprehensive review of published mentoring programs designed for URM faculty to identify “promising practices.”

### Method

Databases (PubMed, PsycINFO, ERIC, PsychLit, Google Scholar, Dissertations Abstracts International, CINHALL, Sociological Abstracts) were searched for articles describing URM faculty mentoring programs. The RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, and

Maintenance) formed the model for analyzing programs.

### Results

The search identified 73 citations. Abstract reviews led to retrieval of 38 full-text articles for assessment; 18 articles describing 13 programs were selected for review. The reach of these programs ranged from 7 to 128 participants. Most evaluated programs on the basis of the number of grant applications and manuscripts produced or satisfaction with program content. Programs offered a variety of training experiences, and adoption was relatively high, with minor changes made for implementing the intended content. Barriers included time-restricted funding, inadequate evaluation due

to few participants, significant time commitments required from mentors, and difficulty in addressing institutional challenges faced by URM faculty. Program sustainability was a concern because programs were supported through external funds, with minimal institutional support.

### Conclusions

Mentoring is an important part of academic medicine, particularly for URM faculty who often experience unique career challenges. Despite this need, relatively few publications exist to document mentoring programs for this population. Institutionally supported mentoring programs for URM faculty are needed, along with detailed plans for program sustainability.

**A**lthough numerous definitions of mentoring exist in the professional literature, traditionally it is a process through which a senior, experienced faculty member (mentor) provides guidance and support for a junior or less experienced colleague (mentee). Mentoring is a critical element for faculty career advancement in academic medicine,<sup>1–5</sup> and mentors can play a variety of roles in helping mentees delineate and accomplish their career goals.<sup>1,6</sup> Ideally, mentors can enable junior faculty to enhance productivity and can provide education about the written and unwritten rules that govern the academic

environment.<sup>1</sup> Faculty members with mentors express more confidence than their peers,<sup>7</sup> report experiencing higher career satisfaction,<sup>8,9</sup> are more likely to have productive careers,<sup>10,11</sup> and feel greater support for their research careers.<sup>12</sup>

Unfortunately, many early-career faculty members, particularly those from underrepresented racial and ethnic minority (URM) groups, are often unaware of the significance of mentoring or cannot find mentors committed to their career success.<sup>13,14</sup> Ironically, laudable traits such as self-reliance that helped URM early-career faculty to navigate graduate and medical school may actually isolate them and hinder them from achieving further success.<sup>15,16</sup>

Numerous studies have reported that URM faculty typically receive less mentoring than their nonminority peers.<sup>17–19</sup> Mentoring programs designed to address unique challenges faced by URM faculty are critically needed. These challenges include marginalization, overt and covert

racism, and a disproportionate share of activities that do not advance careers (e.g., serving on numerous committees; participation in community outreach endeavors; advising minority students, postdoctoral fellows, and residents).<sup>17–19</sup> Finally, URM faculty often treat more financially marginalized patients who generate less revenue but whose clinical care requires more time.<sup>15,20</sup> Two recent reports provide troubling evidence with regard to reversing these disparities and achieving the goal of enhancing successful career trajectories of URM in academic health centers (AHCs). A 2010 report from the Association of American Medical Colleges (AAMC)<sup>21</sup> indicated that nonwhite faculty are less likely to be promoted than white faculty. Another study, based on National Institutes of Health data (2000–2006), indicated that African American scientists are about 10% less likely than their white peers to obtain R01 grants.<sup>22</sup> In a follow-up article that discussed the potential reasons for this disparity, Tabak and Collins<sup>23</sup> hypothesized that variability in access to mentoring may be a causal factor.

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Leaders of several AHCs in the United States have acknowledged the relative paucity of URM faculty and are attempting to increase the diversity of students, trainees, and faculty.<sup>24</sup> The AAMC has stated that enhancing the diversity of AHC faculty is a significant component in the overall strategy to reduce health care disparities in the United States.<sup>25</sup> Over the last decade, a few AHCs have designed mentoring programs specifically for URM faculty to address these various disparities<sup>24,26</sup>; however, the pace of progress has been glacial, and it has yielded mixed results.

We conducted a systematic review of the published literature with a focus on outcomes of mentoring programs designed for URM faculty employed in AHCs. This article extends the descriptive review of mentoring programs by Daley and colleagues<sup>26</sup> for URM faculty in AHCs and includes the updated literature with a focus on published programmatic outcomes. We used the RE-AIM framework<sup>27</sup> to synthesize and describe the primary components of the programs. From these publications, we gleaned “promising practices” that can be widely disseminated to other AHCs, and we suggest ways to enhance efforts to increase and sustain faculty diversity at AHCs.

## Method

### Data collection

We identified relevant publications by searching the following databases: (1) PubMed, (2) PsycINFO, (3) ERIC, (4) PsychLit, (5) Google Scholar, (6) Dissertations Abstracts International, (7) the AAMC Web site, (8) CINAHL, (9) Sociological Abstracts, and (10) the National Medical Association Web site. Two authors (B.M.B., S.L.) conducted searches during four time periods (May–June 2010; November 2010; May 2011; April 2012) to ensure that we included the most recently published articles. MeSH and other controlled search terms included mentor, mentorship, mentoring, AMCs (academic medical centers), best practices, minority faculty, underrepresented minority faculty, training, and professional development. We used these terms and their combinations to search each database to ensure continuity across sources. We further reviewed the references of identified articles to obtain

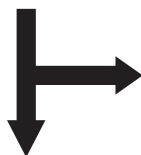
additional relevant publications; we restricted inclusion to those written in English. Figure 1 outlines the number of publications obtained through each step in the search process, reasons for omitting selected publications, and the final number of publications included in this review. We defined mentorship as a developmental partnership in which knowledge, experience, skills, and information are shared between mentor(s) and mentee(s) to foster the mentee’s professional development

and, often, also to enhance the mentor’s perspectives and knowledge.

Two authors (B.M.B., S.L.) independently reviewed the abstracts of publications obtained through the search process and then selected publications for possible inclusion. We addressed disagreements regarding study inclusion by consulting a third reviewer (J.C.-E.) or through review of the full-text publication until consensus was reached; this process was only required on two occasions.

#### Number of publications obtained for screening: 73

- PubMed: 46
- PsychInfo: 11
- ERIC: 10
- National Medical Association Website: 1
- CINAHL: 2
- Sociological Abstracts: 3
- Association of American Medical Colleges Website: 0
- PsychLit, Dissertation Abstracts International, Google Scholar: 0

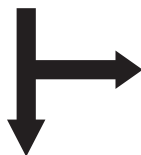


#### Number excluded after initial abstract review: 35 (categories are not exclusive)

- Not academic medical center: 16
- Not faculty: 15
- Not underrepresented minority: 5
- Not about mentoring: 6
- Outside of United States: 1

#### Number retrieved for detailed review: 38

- PubMed: 26
- PsychInfo: 6
- ERIC: 4
- National Medical Association Website: 1
- Sociological Abstracts: 1

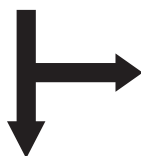


#### Number excluded after detailed review: 18

- Not specific mentoring program (recommendations): 9
- Not about mentoring: 4
- Not underrepresented minority: 4
- Not academic medical center: 1

#### Number included in full text review: 20

- PubMed: 15
- PsychInfo: 3
- ERIC: 1
- National Medical Association Website: 1



#### Number excluded after full text review (duplicates): 2

#### Number included in review: 18

- PubMed: 15
- PsychInfo: 1
- ERIC: 1
- National Medical Association Website: 1

**Figure 1** Number of publications obtained through each step in the search process, reasons for omission, and the final number included in a systematic review of the published literature with a focus on outcomes of mentoring programs designed for underrepresented minority faculty employed in academic health centers.

To be included in the review, publications had to describe mentoring programs based in the United States and identify that their focus was URM faculty. After the initial abstract screening, two reviewers (B.M.B., S.L.) thoroughly reviewed and coded the selected full-text publications. We designed and used a protocol and data collection form to capture from each publication the type of mentoring program; study design, rationale, and goals; location of program and demographics of mentees; enrollment and retention rates; and program outcomes (if reported). Source selection and publication bias was minimized by using multiple types of sources to identify published studies (general source databases, hand-searching of journals, and examining the reference lists of published articles). Further, we maintained a record of articles that were excluded and reasons for their elimination. The quality of selected mentoring programs was assessed by examining study designs, sample sizes, thoroughness of descriptions of the mentoring programs, and program outcomes reported.

### Data analysis

We used the RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, Maintenance, described in detail below)<sup>27</sup> to conduct our analysis. RE-AIM was originally designed to evaluate health interventions, particularly those focused on changing individual and organizational behaviors.<sup>27</sup> However, RE-AIM also is an effective and comprehensive evaluation model for other programs.<sup>28,29</sup> Essentially, mentoring programs are a type of intervention designed to positively influence and enhance the career trajectories of early-career faculty (individual level). Ultimately, these programs also affect the academic institutions (organizational level) because mentoring influences faculty satisfaction and retention.<sup>10,11</sup> Thus, this framework is a useful tool to comprehensively describe these initiatives.

In the RE-AIM framework, *Reach* is an individual-level measure of participation and refers to the percentage and characteristics of members of a defined population (e.g., URM early-career faculty members in an AHC) who receive or are affected by a mentoring program. To determine reach, we evaluated

the numbers of URM faculty who participated in the mentoring programs.

*Effectiveness* is an individual-level measure typically used to describe the effect of a program when conducted in a “real-world” setting. We evaluated effectiveness by summarizing the positive and negative outcomes of the faculty mentoring programs and briefly describing program completion rates.

*Adoption* is an organizational-level measure that refers to the proportion and characteristics of the settings where individuals are willing to participate in a specific program. Because this review focused on the mentoring programs developed in individual AHCs, we defined adoption as characteristics of the program settings and ability of the AHCs to implement the mentoring programs. We combined *adoption* and *implementation* to describe both the settings and components of the mentoring programs for URM faculty, as well as levels of participation.

*Maintenance*, often called “sustainability,” refers to long-term implementation of programming and/or behavior change. We described this metric in terms of subsequent funding sources and the degree of institutionalization of the mentoring programs. Maintenance is critical, particularly with regard to the extent to which programs became part of the culture and norms of the AHCs.

### Results

We identified a total of 73 relevant citations. The review of abstracts led to 38 publications for full-text assessment; 20 of these were included in this review (see Figure 1). We excluded two articles because they did not describe programs based in the United States. Original data were available from 13 studies discussed in 18 articles; duplicative references describing the same program(s) are noted.<sup>30–34</sup> Appendix 1 lists the 13 published reports of mentoring programs for URM early-career faculty identified through the review process.

Overall, the main objective of each mentoring program was to increase the number of URM faculty who pursue careers in academic medicine and dentistry and to enhance the likelihood of their academic productivity and

promotion. The stated goals of the programs were to address numerous barriers disproportionately experienced by URM faculty, including competing academic demands, the historic lack of institutional support and diversity, and the challenge of identifying qualified and interested senior faculty members in specified areas of research. We describe each mentoring program below within the context of the RE-AIM model.

### Reach

Structural models for the URM faculty mentoring programs varied. Two mentoring programs included a partnership between two institutions,<sup>31,35</sup> and several were housed at one institution but were open to early-career URM faculty from across the United States<sup>36–38</sup> or across the United States and Puerto Rico.<sup>39</sup> Two programs focused on early-career URM faculty at one institution but included mentors with relevant expertise from across the United States.<sup>39,40</sup> Two of the 13 programs were available to all early-career faculty members,<sup>31,41</sup> and 3 were specifically designed for only one racial or ethnic minority group (i.e., American Indian/Alaska Natives;<sup>35,38</sup> Hispanics)<sup>42</sup>; the remaining mentoring programs were available to all URM faculty at their institutions.

Program participation rates varied greatly, as did the amount of detail regarding participation. The number of mentees ranged from 7 to 128 early-career URM faculty participants. Because most publications included in this review did not list the number of URM faculty at each academic institution, the overall rate of participation in the mentoring programs could not be determined.

Four mentoring programs also included activities to increase the number of diverse students/trainees interested in pursuing careers in the health professions.<sup>33,34,36,43</sup> These programs included undergraduate students, medical and dental students, students pursuing master's and PhD degrees, and/or postgraduates (residents and fellows). One of these six programs<sup>43</sup> extended the program to include middle school and high school students.

### Effectiveness

Most articles were largely descriptive and provided minimal objective

outcomes, but most included some form of program evaluation. When acknowledged, the lack of outcome data was often attributed to the early stage of most programs. Process evaluations of the individual-level outcomes included satisfaction surveys, focus groups, productivity of participants (e.g., numbers of grant applications, peer-reviewed publications, scientific presentations), retention rates, and the number of faculty promotions. In general, participants reported being satisfied with the various mentoring programs, and programs reported early successes regarding faculty retention and productivity. Manson and colleagues<sup>38</sup> developed a Likert scale questionnaire and identified high rates of receptivity of key program elements among participants. In one of the few long-term evaluations, Daley and colleagues<sup>32</sup> reported a 10-year longitudinal follow-up of 12 of 30 participants in the URM early-career mentoring program at the University of California, San Diego School of Medicine. They reported that 11 of 12 participants (92%) attained promotion to associate professor. When asked what contributed to their success, participants reported critical factors such as support of senior faculty mentors, networking with peers, professional skill development, and better understanding of their institution's culture.<sup>32</sup>

### Adoption and implementation

Although each mentoring program described unique features, universal aspects included offering training opportunities for early-career URM faculty. Programmatic activities were intended to enhance skills in grant and manuscript writing, the development and delivery of scientific presentations, and didactic teaching. Twelve programs provided one-on-one mentoring with senior faculty, with mentors and mentees carefully selected on the basis of alignment of research interests and disciplines.<sup>30,31,33–40,42–45</sup> Senior faculty provided targeted career counseling during regularly scheduled individual meetings. Programs offered tips on stress management, navigating the rigors of academic careers, and time management in monthly group seminars. Two programs<sup>41,42</sup> also included interaction with community advisory boards to provide insights regarding the conduct of community-based research.

Six programs were designed to train early-career URM faculty in specific areas of research: health disparities,<sup>31</sup> oral health,<sup>36</sup> aging,<sup>38</sup> HIV disparities,<sup>39</sup> addiction,<sup>44</sup> and mental health.<sup>45</sup> The remaining mentoring programs provided general career development or were designed for research and/or clinical training in an academic department (e.g., family medicine). Several programs provided direct support for research and research-related activities, such as access to experienced biostatisticians and epidemiologists,<sup>34,45</sup> funds for mentees to attend national meetings,<sup>43</sup> and pilot funding for mentees to gain research experience and generate preliminary data.<sup>31,34,44</sup>

Overwhelmingly, the mentoring programs appeared to be delivered as intended, with few described modifications or changes made to the original designs. However, common barriers to implementing and sustaining mentoring programs included time-limited funding, few participants (which hampered program evaluation), significant time commitments required from faculty mentors, and difficulty in addressing several institutional challenges faced by early-career URM faculty.

### Maintenance

With one exception,<sup>41</sup> each mentoring program began via extramural funding, although many also reported some form of institutional support. Several programs explicitly stated that their goal was to transition from time-limited extramural funding to institutional support; two programs accomplished that goal,<sup>26,34</sup> with the latter achieving program designation within the Office of Academic Affairs and Vice Chancellor for Health Sciences.

### Discussion

The racial and ethnic diversity in the general U.S. population is not reflected in the composition of the health care workforce. African Americans, Hispanic Americans, and American Indians represent nearly 25% of the U.S. population but less than 10% of all physicians. These disparities extend to faculty representation in academic medical institutions. Similar disparities exist for medical school faculty ranks in that the majority of URM faculty are

overrepresented at the rank of assistant professor.<sup>21</sup>

Most mentoring programs arise from a need for experienced guidance vocalized by certain populations; therefore, it is understandable that each institution may have different approaches to address specific interests and needs. Additionally, unique institutional environments and cultures influence program design and implementation. In this review, we sought to identify and assess best practices for mentoring early-career URM faculty by examining published literature describing programs in AHCs. We describe 13 programs that delineated several different approaches to mentoring URM faculty. Good practices included one-on-one mentoring by an experienced investigator, group-based skill-building seminars, access to pilot grants, and support for conducting pilot studies. Institutional components, including the support of key leaders and an allocation of resources, are important for sustaining these programs. These elements are similar to those identified by Palermo and colleagues<sup>46</sup> in a descriptive overview of successful mentoring programs for URM faculty in AHCs.

As the field of mentoring in academic medical centers continues to evolve, conducting comprehensive program evaluation and dissemination of findings will be crucial to ultimately determine the most efficacious and acceptable approaches for mentoring URM faculty. Program evaluation has several important roles, including holding stakeholders accountable and highlighting programmatic areas that may need improvement. Evaluations conducted at multiple time points during formal mentoring programs, as well as those conducted with multiple stakeholders (e.g., mentors, mentees, program coordinators, administrators), will permit a “360-degree” perspective that will provide a robust assessment of program processes and outcomes. Measurement tools specifically designed to evaluate formal mentorship programs in academic settings are available in the scientific literature.<sup>47</sup>

This review was limited by the relative paucity of outcome-driven assessments of mentoring programs for early-career URM faculty. It is essential that outcomes



from successful programs be published to further inform best practices for mentoring URM faculty. Our findings are similar to those of Sambunjak and colleagues,<sup>48</sup> who conducted a systematic review of all published mentoring programs (N = 39). They reported that although mentoring is perceived as an important component of success in academic medicine, the relationship between participating in such programs and subsequent success is not particularly strong.

In the future, it may be beneficial for organizations like the AAMC and the National Association of Medical Minority Educators to create guidelines for program evaluation that will permit comparisons of mentoring programs across institutions. With this type of centralized evaluation, areas such as cost-effectiveness can be addressed, with the goal of making these programs part of the institutional framework in places of higher learning. This is consistent with the recent call by Nivet<sup>49</sup> for AHCs to conduct a “system upgrade,” referred to as Diversity 3.0, to strategically reposition diversity within the framework of these academic institutions.

Previous research has clearly documented both the need for and benefit of dedicated mentoring programs for underrepresented groups.<sup>30,40,50</sup> Establishing standardized programmatic guidelines that can be implemented nationally will not only help ensure the success of underrepresented individuals but also strengthen the country’s academic health care workforce.

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## Appendix 1

**Descriptive Characteristics of 13 Mentoring Programs for Underrepresented Minority (URM) Faculty at Academic Medical Centers\***

Citation	Program goal	Reach	Effectiveness	Adoption/implementation	Maintenance
Buchwald and Dick, 2011 <sup>35</sup> ; Manson et al, 2006 <sup>38</sup>	Provide intensive mentoring to promising junior American Indian and Alaska Native investigators	29 Native American investigators who completed at least 1 year of the training program (n = 19), all core and affiliated faculty (n = 10)	<ul style="list-style-type: none"> <li>Evaluation of the Native Investigator Development Program based on grants and manuscripts (authorship status) and the development of successful relationships</li> <li>Social network analysis used to evaluate the program</li> </ul>	<ul style="list-style-type: none"> <li>Intensive 2-year mentoring program of promising junior Native American and Alaskan Native investigators</li> <li>Individualized mentoring team</li> <li>Seminars on health and health care issues of Native communities</li> <li>Intensive statistics and writing instruction</li> <li>Mentored pilot studies (secondary data analysis in Year 1 and primary data collection in Year 2)</li> <li>Intense weekly interactions with mentors</li> <li>Frequent in-person group meetings</li> <li>Mock review of trainees' grant applications</li> </ul>	Not discussed; however, programs have been in existence since 1998 when external funding was obtained
Daley et al, 2006 <sup>30</sup> ; 2009 <sup>31</sup>	Create a cohort of investigators engaged in health disparities research, scholarship, and practice	19 full-time salaried URM junior faculty and 75 non-URM junior faculty	<ul style="list-style-type: none"> <li>18 out of 19 URM faculty completed the NCLAM National Center of Leadership in Academic Medicine program</li> <li>15 of 18 are advancing their careers at University of California, San Diego (UCSD); specifics not provided</li> <li>4 URMF faculty received pilot funds from the program</li> </ul>	<ul style="list-style-type: none"> <li>Formalized, proactive, instrumental mentoring process</li> <li>12 half-day faculty development workshops</li> <li>7-month, one-on-one mentoring program (12 hours per month)</li> <li>2-hour academic performance counseling session</li> <li>Professional development project</li> </ul>	Project EXPORT funding in collaboration with UCSD, San Diego State University, and local agencies
Bussey-Jones et al, 2006 <sup>41</sup>	Foster a collaborative environment to develop a junior faculty peer mentoring program	7 internal medicine faculty who had been at Emory University between 1 and 5 years	Developed "work rules" and established agreement to adhere and hold each other accountable	<ul style="list-style-type: none"> <li>Division support for time and financial resources provided</li> <li>Two members responsible for the program</li> <li>Peer mentoring program</li> <li>Self-directed didactic curriculum (research, advanced teaching skills, and professional development)</li> <li>Experienced senior faculty advisors</li> <li>Half-day, weekly activities (90–120 min)</li> </ul>	Institutional funding
Johnson et al, 1998 <sup>34</sup> ; 1999 <sup>33</sup>	Development of a mentoring program to increase the number of minorities entering the faculty development pipeline and enhance faculty retention	36 Hispanic and African American early-career faculty	<ul style="list-style-type: none"> <li>Increase in minority faculty from 28 to 32 during the 4 years of the initial program</li> <li>Considered too soon to report on the outcome of the program (at the writing of the manuscript)</li> </ul>	<ul style="list-style-type: none"> <li>Annual meeting regarding career counseling and promotion</li> <li>Assistance in identifying and establishing a mentor</li> <li>Research support regarding study design, data entry, management, and analysis</li> <li>Annual medical scientific writing seminar</li> <li>Workshop to refine presentation skills</li> <li>Provides faculty with access to epidemiologists, evaluation specialist, research assistants, statisticians, and data programmers</li> </ul>	<ul style="list-style-type: none"> <li>Funding the Division of Disadvantaged Assistance, Bureau of Health Professions</li> <li>Institutional funding is also provided</li> </ul>

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## Appendix 1

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Citation	Program goal	Reach	Effectiveness	Adoption/implementation	Maintenance
Kosoko-Lasaki et al, 2006 <sup>43</sup>	Development of a mentoring program to provide junior faculty members with two or more designated mentors	25–33 URM faculty	Impact after 18 months: <ul style="list-style-type: none"> <li>Increased retention rate of URM faculty</li> <li>3 promoted and 1 tenured</li> <li>Increased proportion of faculty on tenure track (25% to 44%)</li> </ul>	<ul style="list-style-type: none"> <li>Annual meetings with the director for faculty development</li> <li>Pairing of mentees and mentors based on 1-page survey on areas of expertise/interest</li> <li>Department chairs included as the mentors</li> <li>Financial support to participate in professional development seminars</li> <li>Required presentation to other URM faculty on their seminar experiences</li> <li>Minimum of 2 annual meetings with mentors with documentation provided to the program coordinator</li> <li>6-month and 3-year evaluations of the mentor pairing</li> <li>Small amount of protected time provided for scholarly activities</li> </ul>	Extramural funding for the Center of Excellence in Faculty Development
Lewellen-Williams et al, 2006 <sup>40</sup>	Development of a multilevel mentoring model (Peer-Onsite-Distance [POD] model) to promote retention and career development among URM medical school faculty	22 mentees, 9 mentors, and 10 on-site mentors	<ul style="list-style-type: none"> <li>Primary outcome: Creation of the POD mentoring model</li> <li>Secondary outcome: Transitioning from a grant-funded program to an ongoing activity supported by the College of Medicine</li> <li>Minimal outcomes reported; largely descriptive. Future studies planned to assess the productivity and career satisfaction of the program's mentees</li> </ul>	<ul style="list-style-type: none"> <li>Multilevel mentoring model</li> <li>Tailored to the unique needs of URM medical school faculty</li> <li>Peer mentors to socialize new faculty to the culture of academic medicine</li> <li>On-site senior mentors to serve as advocates, coaches, and liaisons for their mentees</li> <li>Distance mentors who present annual "lunch-n-learn" seminars on campus</li> </ul>	<ul style="list-style-type: none"> <li>Initiated with an NCI National Cancer Institute cancer disparities grant, but transitioned to institutional funding</li> <li>Established a Center of Diversity Affairs, with a full-time director to manage the mentoring program</li> </ul>
Rabionet et al, 2009 <sup>39</sup>	Development of a multifaceted mentoring model for minority researchers studying HIV health disparities	15 mentors; number of mentees not explicitly mentioned	<ul style="list-style-type: none"> <li>Establishment of a formalized, multi-institutional collaboration for the mentoring program</li> <li>Involvement of service institutions</li> <li>100% of mentors retained</li> <li>90% of mentees retained</li> </ul>	<ul style="list-style-type: none"> <li>Formalized multi-institutional collaborations in Puerto Rico and the United States</li> <li>Careful selection of mentor and mentee pairings</li> <li>Didactic and experiential activities addressing six core areas of cross-cutting research competencies</li> <li>On-site visits to the mentors' research facilities</li> <li>Active engagement in a research project for a hands-on learning experience</li> <li>Participation in seminars, retreats, and interactive group sessions</li> </ul>	Funded by National Center for Research Resources and National Institute of Mental Health (NIMH)
Rust et al, 2006 <sup>37</sup>	Development, implementation, and evaluation of a faculty development program for faculty in family medicine	<ul style="list-style-type: none"> <li>123 faculty</li> <li>(1-year program, N = 86; 6-week modules, N = 18; executive program, N = 19)</li> <li>128 attended one full-day workshop or one module</li> </ul>	<ul style="list-style-type: none"> <li>Three sources of participant evaluations: self-critique, peer-review and faculty assessment</li> <li>Pre- and post changes in self-perceived competencies (2.6 to 4.1; <math>P &lt; .001</math>)</li> <li>Increased percentage of URM faculty 1992–2002: 33% to 81%</li> <li>Two graduates completed masters in clinical research</li> </ul>	<ul style="list-style-type: none"> <li>Menu of career development programs: 1 year/40 afternoon workshops; 6-week module/half-day per week; executive program; one full-day workshop</li> <li>Workshop module includes effective teaching techniques, manuscript writing, manuscript critiques, grant writing, presentation skills, and curriculum development</li> </ul>	Program initiated with a Health Resources and Services Administration (HRSA) grant, but continued with Title VII grants

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## Appendix 1

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Citation	Program goal	Reach	Effectiveness	Adoption/implementation	Maintenance
Sinkford et al, 2009 <sup>36</sup>	Program at a consortium of dental schools to improve the recruitment, retention, and development of URM in the dental profession	<ul style="list-style-type: none"> <li>• 46 URM faculty completed program (24 African Americans, 18 Hispanic/Latinos, 4 Native Americans)</li> <li>• 28 in program at the time of the publication</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluations conducted with mentors and mentee satisfaction with the program and perceived impact of the program on choice of academic career path</li> <li>• Formal impact of the program not provided</li> </ul>	<ul style="list-style-type: none"> <li>• Formal faculty mentoring program</li> <li>• Academic partnerships</li> <li>• Minority supplemental training opportunities</li> <li>• Community-based practice and projects</li> <li>• URM faculty data collection and reporting</li> <li>• Institutional culture and leadership</li> </ul>	Funded by W.K. Kellogg Foundation grant
Soto-Greene et al, 2005 <sup>42</sup>	Development and implementation of a program dedicated to the advancement of Latino medical faculty	Number of faculty not discussed	Specific outcomes not provided; largely descriptive	<ul style="list-style-type: none"> <li>• Advisory Committee on Faculty Professional Development aids in the selection of faculty mentors and assists with mentee goal setting</li> <li>• Program focuses on proposal writing, how to test hypotheses, how to gather, analyze, and interpret data, and how to draw appropriate conclusions</li> <li>• Development of individualized 5-year faculty development plans</li> <li>• Funding support of 50% time for 2 years; departments provide support for an additional year</li> </ul>	Funded by HRSA; Bureau of Health Professions grant
Viets et al, 2009 <sup>44</sup>	Development and implementation of a culturally centered mentorship model for ethnic minority faculty at academic health centers	9 URM faculty (6 Latino; 3 Native Americans); variety of disciplines (medicine, psychiatry, and public health)	<ul style="list-style-type: none"> <li>• Annual debriefing sessions</li> <li>• Mentees were highly productive during the program from pre to post: 12 grant applications (200% increase), 37 publications (336% increase), 62 professional presentations (144% increase)</li> <li>• Produced special journal issue in <i>Alcoholism and Treatment Quarterly</i></li> <li>• Pilot awards contributed to mentee productivity</li> </ul>	<ul style="list-style-type: none"> <li>• Biweekly research group meetings for 3 years; provision of technical support in writing and presentation skills</li> <li>• Education about community-supported investigations and feedback from a community advisory board regarding research projects</li> <li>• Intensive, annual grant writing seminars</li> <li>• Monthly symposia with national speakers</li> <li>• Financial support to attend research seminars and join research societies</li> <li>• Pilot funds for research projects</li> <li>• Annual evaluation regarding participation in the mentoring program</li> </ul>	Funded by National Institute on Alcohol Abuse and Alcoholism
Yager et al, 2007 <sup>45</sup>	Development of a program to enhance the research capacity of junior faculty to conduct rigorous mental health research in primary care settings	14 Native American and Hispanic mentees per cohort	<ul style="list-style-type: none"> <li>• Postprogram funding for the initial mentees: 2 K awards, 1 NARSAD (National Alliance for Research on Schizophrenia and Depression) award, and 1 minority supplement to an R01</li> <li>• Several small university-sponsored awards and industry-sponsored grants</li> <li>• Four promoted to associate professor; 3 no longer engaged in research or scholarly activity</li> </ul>	<ul style="list-style-type: none"> <li>• Weekly group learning seminars</li> <li>• Annual institute with participation by recognized senior minority investigators</li> <li>• Seminars in basic research methods, writing and management of grant proposals</li> <li>• Exportable training curriculum</li> <li>• Administrative and technical support in computer programming, data management, analysis, and statistical and psychometric consultation</li> <li>• One-on-one mentoring sessions</li> <li>• Tutorial sessions to present research study</li> <li>• Informal get-togethers and peer support groups</li> </ul>	<ul style="list-style-type: none"> <li>• Funded by 2 separate NIMH grants</li> <li>• Minority Research Infrastructure Support Program and New Mexico Mentorship and Education Program</li> </ul>

\* Information drawn from review of the literature and organized according to the RE-AIM framework.<sup>27</sup>