

David M. Stoff, PhD<sup>1</sup>;  
Maria Cecilia Zea, PhD<sup>1</sup>;  
Carlos E. Rodriguez-Diaz, PhD, MPHE<sup>2</sup>

Latinos represent a critical resource of talent that could be cultivated to expand the HIV research workforce. However, their rapid growth, as the largest and fastest growing ethnic minority group in the US population, has yet to translate into a significant increase in Latino health academic researchers. Historically, strategies to build a diverse research workforce have grouped together individuals from underrepresented minority populations obscuring significance between and within group differences. This limits approaches that are responsive to the diversity of needs and experiences of emerging investigators from underrepresented groups.

In this article, we discuss challenges associated with heterogeneity of Latinos and barriers that impede research independence/career success in the context of a review of Latino-investigator targeted mentorship approaches on the behavioral-social science of HIV infection. Mentorship workforce strategies could benefit from a personalized framework emphasizing individualized and tailored approaches to address the limitations and gaps in knowledge regarding Latino research development. This perspective encourages increased emphasis on organizational and structural processes to aid in overcoming institutional-level barriers that impede research and career development. Recommendations are proposed for features and components of effective mentorship programs that will lead to robust outcomes for strengthening the Latino research workforce in the HIV research field and elsewhere. *Ethn Dis.* 2020;30(2):305-312; doi:10.18865/ed.30.2.305.

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<sup>1</sup> Department of Psychological and Brain Sciences, George Washington University, Washington, DC

## INTRODUCTION

Latinos represent a critical resource of talent that could be cultivated in efforts to expand the HIV research workforce.<sup>a, see author's notes</sup> Latinos have become the largest ethnic minority group in the United States, reaching 59.9 million and comprising 18% of the US population in 2018, and are the fastest growing segment of the population.<sup>1</sup> However, the rapid growth of the Latino US population has yet to translate into a significant increase in Latino researchers and/or health professionals. For example, Latinos continue to be underrepresented in the STEM (science, technology, engineering, and mathematics) workforce,

comprising 16% of the US workforce, yet only 7% of all STEM workers.<sup>2</sup> In 1997, only 3% of faculty members in US colleges were Latino; 20 years later, this number only increased to 5% in 2017.<sup>3</sup> Moreover, among a large study sample of NIH R01 applications (approximately 83,000), only 3.2% of the principal investigators were Latino, while 69.9% were White, more than a 20 fold difference.<sup>4</sup>

These data are convincing about the scarcity of independent investigators from underrepresented minority (URM) groups and drive the need for strategies to enhance the diversity of the research workforce. However, diversity program development has been mainly for the aggregate of URM groups (ie,

<sup>2</sup> Department of Prevention and Community Health, Milken Institute School of Public Health, George Washington University, Washington DC

Address correspondence to David M. Stoff, PhD; Department of Psychological and Brain Sciences, George Washington University, 2125 G St NW, Washington, DC 20052; davidmstoff@gwu.edu

### Author Notes:

a. There is no consensus regarding the term to refer to persons of Latin American heritage who live in the United States. Both "Hispanic" and "Latino(a)" are used

extensively and often interchangeably. Surveys and US government documents, including the Census, use the term Hispanic. In this article, we use the term Latino, which most members of the specific ethnic group in question, seem to prefer. Latino is used as inclusive of both genders whereas Latina refers to females.

b. When referring to researchers in training, various terms have been used including trainee, mentee, protégé, scholar. We use the term "scholar" since it is believed to have a positive connotation and identifies one who is undergoing mentorship, in the process of research education and training.

African Americans, Latinos, Native Americans, Pacific Islanders) with few tailored to the needs and experiences of specific individual minority groups. In attempting to codify racial and/or ethnic categories, investigators have resorted to oversampling of ethnic minorities or aggregating various racial/ethnic groups in order to achieve a larger empirical base. NIH-supported diversity training programs, such as the NIH Research Education Grant (ie, R25 programs), have enhanced diversity and productivity (publications and grant submissions) of the

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HIV behavioral research workforce for the aggregate of investigators from major URM groups (ie, combining investigators from African American, Latino and Native American groups).<sup>5</sup>

Findings of this nature for the major racial and ethnic minority populations have provided a basis for NIH's leadership in enhancing the diversity of the scientific workforce to train the next generation of scientists, and in developing research capacities throughout the country. While a use-

ful first approach to develop research workforce strategies for all minority groups in general, this ignores the significant differences between and within ethnic minority groups, especially for the Latino population.<sup>6</sup> Since we are currently unable to disentangle potential differences between and within minority groups, it is difficult to create personalized and tailored mentoring programs for scholars-in-training from individual racial and ethnic groups to obtain the most optimum outcomes. A focus within ethnic minority groups would strengthen investigator engagement through tailoring and personalization of programs. Indeed, NIH recommended a shift in a Physician Scientist Workforce Report for more emphasis on individual person-centered research training.

In view of the National Institute of Mental Health training goal of developing a highly skilled and diverse biomedical HIV/AIDS research workforce, we have applied our current interest in Latino investigator development to the HIV research field. As noted above, there is need to address the relative dearth of HIV investigators from the Latino community to attract investigators uniquely positioned to address Latino health. This is driven by knowledge that Latinos are disproportionately impacted by HIV and other STDs in the United States and have been identified by the US Office of National AIDS Policy as a population at elevated risk for HIV infection. Latinos account for one-quarter of the new HIV diagnoses in the United States and this represents nearly three times that of non-Hispanic Whites.<sup>7</sup> Additionally, only half of Latinos diagnosed with HIV are virally suppressed.<sup>8</sup>

With an emphasis on personalized research training to build a more diverse research workforce, we review heterogeneity within the Latino population (Section I) and the relatively unique barriers that Latinos face (Section II) to examine whether the Latino workforce/research training programs have incorporated strategies to address heterogeneity and to reduce/eliminate these barriers (Section III). Relevant review articles with background material are available.<sup>9-11</sup>

## SECTION I. LATINO HETEROGENEITY

Latinos are not a monolithic group as it has frequently been noted that an important factor in understanding Latino population health is the phenotypic variance within the Latino population.<sup>12</sup> They are also genetically diverse as a result of widespread geographic origins within the Americas, as well as variation in patterns of immigration from other continents.<sup>13</sup> In a review of their heterogeneity, the variations within this group were considered nearly as great as those between them and Whites/Anglos or other subgroups.<sup>10</sup>

By distinguishing between Latino subgroups in national populations, we are more likely to reveal and to understand variability in disease outcomes and to address associated risk factors and risk conditions to assist clinical and public health decisions. Some have commented on the difficulties in the use of aggregated health information typically used in state and national surveillance health surveys for Latinos,<sup>14</sup>

however, a disaggregated approach is infrequently used in the research literature on racial and ethnic minorities. Furthermore, this approach of aggregating members from the diverse Latino community is inconsistent with the implementation of effective training and mentoring programs that are dependent on tailoring strategies to the unique needs (cultural and otherwise) and characteristics of researchers in training.

Within the Latino community in the United States, 64.9% are Mexican, 9.3% are Puerto Rican, 3.7% are Cuban, 3.0% are Dominican, and 19.2% are from other Latin American countries.<sup>6</sup> When racial and/or ethnic categories are broad and overlapping, there is the potential to over-generalize HIV outcome data by aggregating all Latino subgroups into one broad category for research purposes and to obscure significant within group differences. These intraindividual differences may be expressed by how social determinants of health modify the Latino epidemiological profile in the United States<sup>11</sup> and how poorer health is associated with higher levels of acculturation and socioeconomic status (SES) among Mexicans, but lower levels of acculturation and SES among Latino whose origins are from Caribbean Islands.<sup>15</sup> Differences among subgroups within the larger Latino group may also be important in obtaining a more accurate reflection of the barriers and facilitators (described in Section II) to research independence, especially among those with different language abilities and variability in cultural/contextual norms.

## SECTION II. LATINO BARRIERS

Scholars<sup>b</sup>, see author's notes from URM backgrounds face multiple barriers to research (eg, higher financial burdens, social and professional isolation, and race- or ethnic-related biases), which limit their career advancement and the ability to achieve more equitable representation in the biomedical science fields. Unfortunately, the impact of barriers on research and career advancement of Latinos has not been well-studied since most studies have examined clinical trial research participation as an outcome.<sup>16</sup> One of the few studies on barriers to career success of investigators from the major URM groups, employed a sophisticated concept mapping analysis to demonstrate that creating opportunities for mentoring was the most feasible specific action among URM researchers in competing for NIH funding.<sup>17</sup> To the best of our knowledge, there have been no studies on Latino barriers to career success that disaggregate Latinos into subgroups and maintain adequate sample size with sufficient power for development of tailored mentoring programs (described in Section III).

URM-related barriers are far-reaching, ranging from psychosocial issues to logistical concerns to research-related factors, so that a useful way to examine their impact is at multiple levels including individual, institutional, organizational-structural, social-cultural-systemic.<sup>18</sup> At the *individual* level, critical barriers include the scarcity of mentors and of adequate role models, deficiencies in grantsmanship and other professional “survival” skills, inadequate methodological expertise

and lack of self-confidence or isolation. Predominant research methods may not be suitable for the kind of exploratory, developmental research that is needed by new Latino investigators in many communities,<sup>9</sup> as well as limitations in access to large samples, especially when groups within the Latino population are studied.

Latino scholars and other researchers of color often come to academia as cultural outsiders and are required to learn the language of reviewers and funders, the gate-keepers who are more likely to exclude researchers that have not “acculturated” into funding agency language.<sup>19</sup> Also, macro-level barriers at the *systemic, institutional and structural* levels (eg, lack of institutional support and of a strong culture for research, deficient research infrastructure and resources) deserve more consideration in promoting the research career of new and early career stage investigators.<sup>20</sup> Hispanic-serving institutions have evolved primarily as teaching institutions and faculty are often required to teach a large number of courses and carry out administrative activities due to demands of increasing student enrollment. Inter-institutional partnerships might address Latino personnel shortages and are generally required for global HIV research but rely upon obtaining external support, which has its own attendant issues and complexities.

Promoting the research career of Latino investigators and/or working with Latino populations in research requires accommodations to specific cultural and contextual dimensions of their lives, in particular, language barriers that cover the spectrum of communication skills. For example, many Latino investigators often publish in Spanish-

language journals, which serves dissemination purposes, but publishing in English-language journals is considered essential in competing for NIH funds. Latino scholars may also face significant unexpected expectations, through assuming family financial and caretaking responsibilities. Discrimination and internalized feelings of inferiority that translate into decreased self-confidence may lead to attrition and falling out from the pipeline.

Most current research workforce models have targeted individual-level barriers with much less attention to barriers at the macro-structural and institutional levels. Further studies into these types of barriers derived from research that these macro-level barriers account for more than half of the important barrier clusters to minority investigator applications for research funding (ie, insensitivity, misperceptions and miscommunications; institutional bias; unfair competitive environment; lack of institutional support).<sup>17</sup> Attention is also needed for the community and environmental factors including economic barriers and social environments. Future workforce models should target social determinants of health, discrimination, poverty, residential segregation and disparities in educational quality in various racial and ethnic minority groups. Institutional-contributing challenges, such as implicit bias, stereotype threat and microaggressions, must be identified since they impede trainees from exhibiting their optimal research productivity. Appropriate interventions (through mentoring, coaching, and otherwise) should be developed to reduce their impact. Other more systemic barriers may include economic instability, limited educational and employment opportunity,

and competing work-life demands of investigators. Finally, facilitators that enhance workforce participation and development (eg, gaining knowledge, contributing to the community, providing incentives, acculturation to the NIH research community) need to be integrated as features in mentoring programs for Latino scholars and other URMs.

### **SECTION III. LATINO MENTORSHIP PROGRAMS**

Ideally, effective mentorship programs should overcome certain barriers within investigators of specific Latino subgroups. Table 1 presents research mentoring programs for Latino researchers in-training. We have categorized these into two types of programs: Conference-based<sup>21-23</sup> and Institute-based.<sup>24-29</sup> Positive features of conference-based mentorship programs were availability of mentors/networks, employing national organizations (ie, National Hispanic Science Network, Society for Advancement of Chicanos/Hispanics & Native Americans in Science), as a major recruitment source and virtual mentorship network. This provided a valuable resource to offer research-professional networking of inadequate acculturation into the scientific enterprise and also to overcome the lack of local expertise of most institutions to support mentorship of Latino investigators. Positive features of institute-based mentorship programs were the more intensive, longer-term year-round training period and the creation of a dedicated infrastructure that would support didactic, grantsmanship, and research opportunities. Many of the institute programs also partnered with other col-

laborating entities (eg, research centers, health disparities centers) to provide additional resources that were integrated with the institute. Institute based programs built their own local mentoring network for mentor-trainee matching, standardization of mentoring activities, and regularly occurring workshops to develop trainee research projects. Programs in Table 1 address mainly health disparities research by Latino investigators at various career levels. This emphasis on disparities-related programs is consistent with evidence that Latinos experience some of the worst disparities<sup>30</sup> being challenged by chronic diseases, HIV and other sexually transmitted diseases, tuberculosis and cirrhosis.

The above-mentioned attributes of existing Latino mentorship programs are promising but have several limitations requiring further program development. A more comprehensive strategy should combine the conference model with the more structured year-round institute model to offer mentoring, research experiences and didactic foundations in professional/research skills and grantsmanship. Along these lines, research networks (eg, HIV Prevention Trial Network, HIV Vaccine Trial Network, Centers for AIDS Research, Adolescent Trials Network) are uniquely positioned to implement mentoring programs since they have all the benefits of conference-based and structured institute-based programs with additional advantages of a rich research database (for trainee studies) and an infrastructure to coordinate these programs.

Below and in Table 2, we highlight some of the features and components that could enrich the existing (and additional) programs for more robust and sustaining outcomes.

**Table 1. Mentoring programs for Latino investigators<sup>a</sup>**

Ref	Latinos Targeted	Mentoring Platform	Research Focus	Outcome
Conference-based Programs				
21	Chicanos, Hispanics and Native Americans; college students to professionals	Annual conference (Society for Advancement of Chicanos/Hispanics & Native Americans in Science) in scientific research and professional development activities	Research in Science, Technology, Engineering, and Math (STEM) disciplines, mainly Life Sciences	Not reported
22	Hispanics from NIDA-supported National Hispanic Science Network; various career levels	Conference-based formal and informal mentoring activities (eg, speed mentoring, new investigator panel, networking)	Substance abuse and health disparities research	Not reported
23	Latino investigators from National Hispanic Science Network; new early career researchers	Conference-based (NIMH R13) linking early career investigators with senior faculty as mentors	Mental health research	68% submitted papers; 78% submitted grant application
Institute-based Programs				
24	Mostly Latinos; Postdoctorals and early stage investigators	Two-year project period of research preparation followed by mentored training (Matched with experienced researcher from Center for AIDS Research CFAR and collaborating Community-Based Organization member) followed by implementation (NIAID Supplement)	HIV prevention, care and treatment to reduce disparities in the Hispanic/ Latino community	Not reported
25	Latinos (Puerto Rico); undergraduates and graduate students	Minority Research Infrastructure Program (NIMH); Career development activities and research experiences	HIV mental health research	Not reported
26	Hispanics; predoctoral, postdoctoral, physicians and junior faculty (clinicians and health-related degrees)	University of Puerto Rico, Medical Science Campus (NIMHD R25, Clinical Research Education and Career Development); Master Science in Clinical & Translational Research and Research Experience	Health disparities research	134 Grant submissions (over 10 yrs funding) and 91 (68%) funded
27	Latinos (Puerto Rico); undergraduate students paired with community residents	Experiential learning, ethnographic mapping, Community-Based Participatory Research framework (NIMHD P60)	Health disparities research	Not reported
28	Mainly Latino; undergraduates, masters and doctoral students	UCLA Center for Population Health and Health Disparities Transdisciplinary (NHLBI, NCI); Community-engaged summer training program with professional and grantsmanship activities	Health disparities research	"Modest success" in degree completion, publications, and obtaining next career stage appointments
29	Latinos (Puerto Rico); predoctoral students and early career faculty	Puerto Rico Mentoring Institute for HIV and Mental Health (NIMH R25); Competency-based one-on-one and peer mentoring	HIV social, behavioral research in women's mental health, stigma, adherence	Not reported

a. Comprehensive Medline search was conducted (August 2019) using key search words "mentoring, training, Latino, Hispanic, behavior" to generate the above research studies.

## 1. Stratifying Investigator Cohort

When each cohort of URM investigators, are stratified into groups, variance should be reduced to obtain more homogeneity and make men-

toring more precise, thereby increasing chances of more optimum outcomes. For Latinos, the most obvious way is through comparisons with Latino groups (eg, Mexican Americans, Cuban Americans, Puerto Ri-

cans), and it may be more powerful to raise unique research questions for the different groups (see section I in this article). Tailoring type of mentoring to the needs of individuals is called for, where peer mentoring may



**Table 2. Recommended features and components for Latino and other URM mentoring programs**

Institutional
Partnerships and collaborations with academic and nonacademic entities
Culture of research, committed mentoring climate and engaged senior leadership
Strengthening retention, transitioning to next career stage, and supporting alternative career choices
Incentives and rewards for mentoring
Program
Conceptual framework for career development/mentoring
High priority public health research experiences
Didactics with methodological training
Mentor training
Engagement with community stakeholders
Role of sociocultural factors (e.g., implicit bias, stereotype threat, microaggressions)
Formal evaluation guided by logic model
Trainee
Stratifying investigator cohort
Creating individual development plan
Assessment of trainee competencies

be more effective in some groups because of a relationship-centered person-to-person approach that overrides any hierarchical differences.

## 2. Institutional Mentoring Climate and Sociocultural Factors

We need to go beyond a representational approach (using representation from the overall minority population as the guide and the target to be achieved) to a systemic approach (how outcomes at each career stage are influenced by institutional settings and career decisions) and quantify the sociocultural factors (eg, implicit bias, stereotype threat, microaggressions, academic self-efficacy) that have a significant impact on why people enter, stay or leave science at each career stage.<sup>31</sup>

## 3. Conceptual Model

Programs should be grounded in a conceptual model to guide the questions to be addressed and for the development of more focused

programs. The conceptual model for a Latino mentoring program should be relevant to the needs and experiences from the community of interest to strengthen cultural responsiveness. For example, *familismo* (strong sense of family orientation), *promotores* (reliance on interpersonal communication and social networks) and collectivism (desire for the group orientation over the individual and for consensus) are essential parts of Latino culture. All emphasize networking which is consistent with Social Cognitive Career Theory<sup>32</sup> ie, career decisions are shaped by social and institutional context, or Intersectionality Theory<sup>33</sup> ie, health disparities framework for understanding multiple social identities of Latinos.

## 4. Cultural Competency Training and Contextually Focused

Embedding mentoring in cultural competency framework is necessary to address issues such as lan-

guage, cultural customs, humility, power, privilege, and social justice. This will also be enriched by inclusion of community members and stakeholders in entire research process.

## 5. Formal Evaluation

Formal process and content evaluation, utilizing logic models, is essential to analyze program activities; define measures of program outcomes and impact; and determine effective mentoring program components.<sup>34</sup>

Recently, personalized or precision medicine (ie, strategies that take individual variability into account) has gained traction regarding health care delivery,<sup>35</sup> but it has yet to be applied conceptually to the research education/training domain. In view of the considerable variability within the Latino population as well as in the barriers experienced by developing investigators (see Sections I and II), further mentoring workforce strategies could benefit from a personalized framework that emphasizes individu-

alized and tailored approaches and synthesizes most of the above-mentioned mentoring program additions.

This may be accomplished in at least two ways: 1) creating collaborative mentorship programs in which communicative action, teamwork and social interactions are honored and resonate with collectivist values of Latino investigators; and/or 2) implementing mentored research that characterizes broad Latino groups into subgroups that may differ along relevant research or disease-related dimensions, such

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as pharmacogenomics or participant diversity, that are related to disparities. This customized mentored approach is consistent with the emphasis on diversity in the era of precision medicine<sup>36</sup> and, in short, emphasizes delivering the right mentoring to the right investigators and for the right population groups under research.

## CONCLUSIONS

The efficacy of mentorship is most often determined by whether or not diverse trainees reach key accomplish-

ments in their career or achieve “hallmarks” of success. The NIH Diversity Program Consortium has identified these outcomes (eg, entering and completing graduate school, attaining a research or academic position, receiving an R01 grant) as critical along the pathway to career success. While outcomes still remain a useful index of success, we can further strengthen these outcomes through questions about the trainee dynamics regarding workforce development. For example, what motivates individuals from URM groups to enter behavioral, clinical or biomedical research career paths, and what factors contribute to their sustained participation? What must happen during different training stages to ensure that trainees from URM backgrounds develop the skills, knowledge, and competencies essential to successful careers in the research workforce?

This emphasis on individual trainees may be necessary, but not sufficient, to increase numbers in the scientific workforce. In addition, the field needs more attention to organizational and institutional initiatives and policies to further enrich existing approaches for more powerful mentorship. This might include such questions as: How do institutional structures and resources facilitate research training and professional development activities, so individuals successfully navigate through these settings? How can we promote sustainability of institutional-professional opportunities that further engage, empower, and retain new investigators and their developmental trajectories? Addressing these kinds of questions may further achieve equity in the research workforce by shifting the focus for future

mentorship programs from strategies focusing on individual trainees to a more tailored, and more interactional, environmentally driven approach. In this way, organizational context and institutional structures will be emphasized in supporting individual competencies for career advancement.

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## CONFLICT OF INTEREST

No conflicts of interest to report.

## AUTHOR CONTRIBUTIONS

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