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The Final Frontier - Transitions and Sustainability: From Mentored to Independent Research

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Abstract

A recurrent theme in much of the contemporary HIV behavioral and social science research is that ecological approaches that acknowledge the interplay of structural, institutional, and individual-level factors are essential to improve HIV prevention efforts in racial/ethnic minority communities. Similarly, an ecological approach provides an innovative framework for understanding the challenges that many racial/ethnic minority HIV prevention researchers face in their quest to transition from mentored researcher to independent researchers. Informed by an ecological framework, and building on our experiences as two racial/ethnic minority women HIV prevention researchers who transitioned from a formal research mentorship relationship to become independent HIV prevention researchers — principal investigators of NIH-funded R01 grants —, we frame our discussion of the mentored to independence research trajectory with a focus on structural, institutional, and individual determinants. Throughout, we integrate suggestions for how institutions, mentors, and HIV prevention researchers can facilitate the final frontier from mentored research to independence.

Keywords

Barriers to sustainability; structural; social/institutional; individual; mentoring

Introduction

There is a disturbing dearth of racial/ethnic minority HIV researchers to address the HIV prevention needs of African Americans and Latinos, who are disproportionately affected by HIV/AIDS in the United States (US).¹ The benefits to having more racial/ethnic minority HIV prevention researchers are innumerable.² Among them, many racial/ethnic minority researchers have an insider's perspective on the social, cultural, historical, and structural issues that contribute to HIV/AIDS among communities of color. They often bring the ability to design research and interventions that are culturally competent,³ in the sense that they meet the needs of culturally diverse groups;⁴ and often share a strong commitment to the communities in which they were raised. Moreover, racial/ethnic communities may more readily accept and trust the messages and motives of racial/ethnic minority researchers than those of White researchers. Although there is a dire public health need to encourage and engage more racial/ethnic minority scholars to conduct HIV prevention research, they remain severely underrepresented in academia,⁵ National Institutes of Health (NIH) Intramural research,⁶ and NIH extramural research.^{7,8}

A recurrent theme in much of the contemporary HIV behavioral and social science research is that ecological approaches that acknowledge the interplay of structural, institutional, and individual factors,⁹ are essential to improve HIV prevention efforts in racial/ethnic minority communities.^{10,11} The ecological approach also provides a useful framework for understanding the nexus of challenges that many racial/ethnic minority HIV prevention researchers face in their quest to transition from being mentored researchers to becoming independent researchers. We define independent researchers as those who have served as a principal investigator (PI) of a NIH-funded R01 award. Informed by ecological frameworks, we frame our discussion with a focus on structural, institutional, and individual determinants of the mentored to independent research trajectory; and provide specific suggestions for how institutions, mentors, and HIV prevention researchers can facilitate the final frontier from mentored research to independence (Figure 1).

We also reflect on our experiences as two racial/ethnic minority women HIV prevention researchers who transitioned from a formal mentored relationship with the Visiting Professors (VP) Program at the Center for AIDS Prevention Studies (CAPS) at the University of California, San Francisco to become independent HIV prevention researchers. Since completing the CAPS VP program, the first author has served as the PI of three NIH-funded HIV prevention R01 awards. The second author has served as the PI of two NIH-funded HIV prevention R01s and as the joint PI of another. We have also served as members of HIV-related study sections at NIH. Accordingly, this article, in addition to highlighting theory and research on the transition and sustainability process, also reflects our experiences on the mentored to independent HIV-prevention researcher trajectory.

Structural Determinants of Independence

The historical legacy of racially and socioeconomically-rooted educational disparities from kindergarten through university in the US highlights cumulative gaps between the educational accomplishments of White researchers from middle class backgrounds and those from racial/ethnic minority and/or from low income backgrounds.⁷ Racial/ethnic minority individuals are disproportionately less likely than their White counterparts to have access to the undergraduate degrees that are an essential pathway to postgraduate research careers.^{12,13} Not surprisingly, this gap in the researcher pipeline means that there are fewer racial/ethnic minority researchers with doctorates and advanced training to submit grant applications to NIH. For example, compared with White researchers who submitted 70% of applications between 2000 and 2006, Asian Americans, Latinos, Blacks, and Native Americans submitted 16%, 3%, 1% and .05% of applications respectively.⁷

Racial bias in the NIH review process further compounds the blocked HIV prevention researcher pipeline issue. Between 2000 and 2006, on average, 28.1% of the applications submitted to NIH were funded. However, compared to White researchers, Black, Asian American, and Latino researchers were 13%, 5%, and 3% respectively, less likely to receive research funding.⁷ Rather than judging applications on their merits, there is a tendency for reviewers, who are predominantly White, to give the benefit of the doubt to more established, well known, White researchers. By comparison, racial/ethnic minorities who may not have had access to the key resources so common among their White counterparts

(e.g., undergraduate and/or graduate degrees from top-tier universities, research mentors, research infrastructure, pilot funds) may be lesser known, and thus judged more critically than their White counterparts.^{14–16} Generational issues may also play a role. The head start that reviewers, who are disproportionately senior researchers, White and male, have benefited from is considerable. Their senior rank provides benefits such as invitations to join study sections, and having the time to participate on study section without concern about how doing so might compromise tenure or promotion. Most early career investigators do not enjoy the same privileges. The interplay of factors such as generation, race, and gender underscores how decades of bias and discrimination are structured into the review process. The disproportionate representation of White reviewers reflects the historical legacy of institutional racial discrimination that denied equal opportunity to racial and ethnic minority scientists, as well as the intrinsic biases that persist despite the eradication of discriminatory laws and policies.

Although research on the predictors of receiving NIH funding is scant, one study cites having participated as a reviewer on a study section as a strong predictor.⁷ Serving as a reviewer provides crucial information about what NIH reviewers expect in applications, and also insights into study section group dynamics that may affect the review process. Historically, NIH had premised study section membership on having served as a PI of a NIH-funded grant. In recognition of the disparate impact of this policy on racial/ethnic minority researchers and early career researchers, NIH in recent years has reversed course and invited early career researchers to participate in study sections and benefit from this experience.^{8,17} The Earlier Career Reviewer Program attempts to enrich the existing pool of NIH reviewers by including early career scientists from less research-intensive institutions as well as research intensive institutions.¹⁷ The explicit addition of racial/ethnic minority HIV prevention researchers to the list of new study section invitees, regardless of career stage, could be an important step in helping to solve the independent racial/ethnic minority HIV prevention pipeline problem.

Institutional Determinants of Successful Transition

Variability in access to research mentorship and other resources provides further obstacles to NIH funding.⁸ Access to research mentorship at the undergraduate, graduate and post-doctoral levels, as well as during early career is critically important to the development of an independent research career¹⁸. Yet, institutions with the mission of educating predominantly racial/ethnic minority students such as Historically Black Colleges and Universities (HBCU), Institutions with High Hispanic Enrollment (HHE), and Tribal Colleges (TC) are severely underfunded compared with mainstream institutions of higher education. Although HBCUs, HHE, and TCs have a large pool of racial/ethnic minority students and faculty, they often lack the resources and infrastructure to train and mentor the next generation of independent researchers. Moreover, social and professional networks with funded researchers, other elements essential to the development of a successful independent researcher career, may be hard to develop at minority serving institutions where independent researchers may be scarce.¹⁹ Having noted that “current research capacity at HBCUs is not commensurate with these institutions' vision, credibility, and track records in developing outstanding research scholars”, Threadwell and colleagues have advocated for “fully

integrated, strategic alliances with faculty at majority institutions [as] a way to significantly increase the research capacity of these institutions”(p. S 55).²⁰ We agree with this recommendation.

High teaching and service overloads often pose considerable obstacles for racial/ethnic minority faculty interested in becoming independent researchers. The “minority faculty syndrome,” the tendency for institutions to ask people of color to be the university and department faces and voices of diversity and multiculturalism, is well-documented.^{21,22} Compared with their White counterparts, racial/ethnic minority faculty are typically asked to join or are assigned to numerous committees, or asked to represent the department and/or university at various events to demonstrate the institution's commitment to diversity. This robs racial/ethnic minority faculty of the substantial time needed to conduct the research critical to: demonstrate their research qualifications for a NIH award, publish peer-reviewed manuscripts to bolster grant applications, and write grant proposals. Moreover, compared with top-tier universities, predominantly minority-serving and less-well funded institutions typically have higher teaching loads^{23,24} that further decrease the odds that racial/ethnic minority faculty will develop and maintain a strong program of independent research.

Another institutional and individual-level obstacle that many racial/ethnic researchers face is the implicit expectation that they will or should mentor more racial/ethnic minority students than their White counterparts. Although many racial/ethnic minority faculty share a deep commitment to mentoring the next generation of racial/ethnic minority scholars, this mentorship can be costly if conducted too early during the research development stage. This is because mentoring students can be time-consuming, exacting precious time that faculty need to conduct research, write and publish manuscripts, and write and submit grant applications. To counter these professional costs, institutions committed to advancing the research careers of racial/ethnic minority faculty should monitor service and mentoring commitments to ensure that they are equitably shared across faculty members. Institutions can also commit to protecting the time of faculty, particularly early career faculty, who wish to develop independent research careers.

Institutional resources are indispensable to the development of research independence.⁸ Yet, pre-doctoral and even doctoral programs may lack education about the importance of securing research funds. Institutional resources include, but are not limited to: seed funding for preliminary studies; administrative support for the preparation of budgets, budget justifications, and other administrative components of the application; the provision and funding of research assistants; peer review of applications prior to submission; and professional editing services. The institutional resources that universities, research administration offices, and departments provide (or fail to) can substantially aid or deter the preparation and submission of grants. Faculty who lack these institutional resources risk the likelihood of submitting lower-quality applications because instead of devoting the time needed to develop high-quality science to increase the chances of funding, their time instead is spent on the copious and time-draining administrative aspects of the application. These administrative aspects are very important, but alas it is the science, not the perfectly crafted budget justification that will summon grant funding. There is a critical need for institutions

committed to facilitating research independence to ensure that faculty members have the tools needed to concentrate on the science to increase their chances of obtaining funding.

Nor should institutional support be limited to the first grant proposal submission. From mentored research to independence, institutional support includes things such as: funding for graduate research assistants, particularly for faculty who may lack such funds or be between grants; bridge funding to support research staff between grants; and opportunities for course releases for faculty to write, revise and/or resubmit grant proposals. In the absence of these resources, faculty may find themselves with higher teaching loads and/or more administrative responsibilities; things inimical to a successful independent research career. There is also a need for racial/ethnic minority faculty to proactively negotiate the resources they need if they are not readily available.

Individual Factors that Facilitate and Impede Independence

Contemporary scholars are more likely to receive job offers if they have the potential to be funded. Furthermore, they may need to secure funding as a condition of tenure, promotion, or to supplement their salary. Thus, an individual-level factor critical to independence is for faculty to know the formal and informal requirements of their institutions and what types of grant funding their institutions value for tenure and promotion.

Racial/ethnic minority role models are also fundamental to the transition from mentored research to independence; but alas, rare at most institutions of higher education in the U.S. Asian/Pacific Islander, Latino, Black and American Indian/Alaska Natives represent less than 9%, 4%, 3%, and 1% respectively of full-time faculty in US institutions of higher education.²⁵ Racial/ethnic minority role models implicitly and explicitly convey the message that people of color can become accomplished and independent researchers. They can also be invaluable resources for each other.

Although racial/ethnic minority mentors play a critically important role, their absence does not preclude success. Recognizing the dearth of mentorship for racial/ethnic minority researchers, HIV prevention mentorship programs such as those provided by the CAPS Training Program for Scientists Conducting Research to Reduce HIV/STI Health Disparities (often called the VP Program)²⁶, the Minority HIV/AIDS Research Initiative (MARI)^{27,28}, and the American Psychological Association's Cyber Mentors Program²⁹, have all addressed research mentorship gaps with opportunities for racial/ethnic minority researchers to be mentored by a racially and ethnically diverse core of HIV prevention researchers either in person, or as is the case with the Cyber Mentors program, virtually.

For researchers new to the NIH grant process, becoming an independent researcher may necessitate mastering the culture of NIH and the science and art of NIH grant proposal writing. For those new to the experience, grant-writing can be “akin to arriving in and adapting to a new culture”(p. S16),³⁰ and also intimidating and discouraging. Having a good and experienced independent research mentor is invaluable to learning how to navigate obstacles to writing, submitting, revising, and obtaining NIH funding (see Manson, this issue). Mentorship is a reciprocal, dynamic relationship between a mentor and mentee that

promotes the satisfaction and development of both (see McGee, this issue). A good mentor is like an experienced cultural broker who can help navigate the NIH research culture with a road map tailored to the needs of the mentee and who can help translate the unfamiliar language until the mentee gains proficiency. Because mentees come from diverse academic, cultural, and social backgrounds, a good mentor aims to identify the most important skills that the mentor-mentee dyad needs.³¹ Good mentors transmit knowledge, but most important, help mentees understand the requirements of attaining independence, help increase the social capital of mentees, and provide the psychosocial support that mentees need to thrive.³² Nor should mentorship be limited to the grant-writing process. Guidance about the importance of peer-reviewed publications is a critical prerequisite to grant funding.³³ A strong mentor will advise on the types of empirical articles that mentees should be writing and submitting for peer-reviewed publication, read and suggest improvements and revisions to drafts of manuscripts, and work with mentees to determine the best refereed journals for manuscript submission. Good mentors also offer the wisdom that they have gained from their own experiences applying and obtaining NIH funding, and can provide insights about how reviewers might perceive a concept, phrase or methodological design.

Self-efficacy, the conviction that one can write a successful grant proposal, is another individual factor that facilitates the transition from mentored research to independence. There is evidence that grant self-efficacy increases after participation in a research mentoring program.²² Racial/ethnic minority researchers' experiences with lower rates of NIH funding, may explain why racial/ethnic minority researchers revise and resubmit unsuccessful applications at rates lower than their White counterparts.⁷ It is unclear why racial/ethnic minority researchers are less likely to resubmit, but harkening to our earlier cultural broker analogy, they may lack the mentorship necessary to help them translate the critiques into a successful revision and resubmission. HIV prevention programs such as CAPS, MARI, and Cyber Mentors are invaluable to providing the support and resources needed to boost grants self-efficacy and the ability to persevere after rejection. Indeed, Pfund et al. (this issue) identified the encouragement of persistence as one of the core attributes of effective mentoring relationships.

Sustainability: Maintaining the Momentum to Independence

Getting the first NIH grant is a substantial professional feat: obtaining the grant is hardly the sole benefit, however. Fears or concerns about tenure or promotion may at last be allayed, and institutions and colleagues may perceive that new PIs have advanced to another tier of expertise, and well, they have. R01 awards may bring invitations to join NIH study sections, many solicitations to give keynotes and presentations at national and international conferences, job offers, and greater attention and respect from university administrators.

Alas, getting the first NIH grant is just the initial hurdle. Sustaining an independent research career issues in a host of new and unforeseen challenges, different from, but not unlike the magnitude of the challenges of securing the first R01. Accordingly, in this final section we address the challenges of sustaining a career as an independent researcher. In line with our ecological framework, we begin with some of the structural challenges that threaten sustainability. The first and most obvious of these is the limited availability of funds to

support future research. U.S. federal funding for research has remained flat for over a decade, and sequestration issued in an automatic 5.5% spending cut to NIH's budget, resulting in a 25% decrease in NIH's purchasing power compared with 10 years prior.³⁴ This flat and reduced funding has precipitated a decline in application success rates, with funding rates reaching their lowest points in history.³⁵ Racial bias notwithstanding, current funding levels make it even harder to obtain the first R01, the holy grail of independence. Moreover, this tighter funding climate means that it is increasingly harder to remain funded after the first R01 award.

Add in racial bias within study sections and the probability that White researchers are nearly twice as likely to receive NIH grants compared with their Black counterparts,⁷ and the challenges to sustainability increase substantially. Redressing racial bias within study sections will demand a systematic approach that uses methods to detect bias before, during and after the review process. We recommend that studies be conducted on the review process to better understand the mechanisms that result in bias. One approach might involve providing study section reviewers with blinded sections of the proposal to score first, and then once the application is judged meritorious, provide reviewers with identifying information about the investigators and their institutions.

Sustained mentorship is also instrumental to sustainability.^{36,37,38} The CAPS program continues to provide current and former VPs with peer reviews of NIH proposals prior to submission. In addition to having their proposals reviewed, former VPs serve as peer reviewers of past and present VPs. Other programs suggest that opportunities for sustainability can be enhanced by: the creation of networks and peer-mentoring strategies,³⁶ systematic training in mentorship for mentors;³⁷⁻³⁹ and the identification of the most effective strategies for matching mentor and mentee dyads to yield successful outcomes.⁴⁰ Institutions can implement similar mentoring programs to promote sustainability for mentored and independent researchers.⁴¹

Maintaining a successful independent research career also demands being theoretically and methodologically innovative and nimble. Rather than submitting applications that vary slightly from the previously successful grant, independent researchers must learn current NIH priorities and evolve and innovate accordingly. The funding climate is simply too tight to risk the chance that what worked in the past will work in the present. Research offices and universities with Centers for AIDS Research can provide opportunities for professional development and skill building so that researchers can hone and learn new theories and methods and revamp HIV research skills.

Fostering collaboration with co-investigators who are conducting new and innovative research is also key. Whereas at the mentored research stage, the challenge is to identify strong collaborators, independent researchers tend to have a network of former or potential new collaborators. Often, past success is prologue, as prospective co-investigators are likely to be interested in collaborating with someone with a track record of NIH funding. Universities can also facilitate the collaboration process by structuring opportunities (e.g., networking events) and systems (e.g., maintaining databases of researchers' interests) to connect early career and independent researchers.⁴¹

Finally — and unfortunately — the structural determinants that vexed the mentored researcher do not disappear at the independent researcher stage. This final frontier of sustainability requires learning how to troubleshoot and resolve institutional hassles and barriers to research productivity. Rather than being depleted by institutional barriers, many independent researchers learn how to surmount them. Identifying colleagues and peer networks willing to share successful strategies³⁶ is one approach to offset administrative burden, concentrate on the science, and enhance grant application and research program productivity.

In the context of the transition from mentored to independent research, the term “final frontier” connotes an endpoint that, in essence does not really exist. As long as financial uncertainty and racial bias exist in research, racial/ethnic minority HIV prevention researchers will likely encounter a host of old and new challenges on their routes from mentored research to independence. Accordingly, we hope that the structural, institutional, and individual determinants and suggestions that we have discussed here will pave the way for a successful journey to the frontier of independent research.

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Figure 1. Ecological Framework: Structural, Institutional, and Individual determinants of mentored to independent research trajectory and sustainability