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## Outcomes of a Career Development Program for Underrepresented Minority Investigators in the AIDS Clinical Trials Group

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We surveyed awardees of the Minority HIV Investigator Mentoring Program (MHIMP) of the AIDS Clinical Trials Group. Most reported clinical specialization in infectious diseases or HIV medicine (86%), and all but 1 (95%) are engaged in medical/health sciences research. The MHIMP helped retain early-career minority investigators in HIV/AIDS-related research.

**Keywords.** career development; infectious diseases; mentorship; minority investigators; training.

HIV infection disproportionately affects individuals from racial and ethnic minority backgrounds [1]. Nevertheless, minority populations remain underrepresented in research studies [2–4]. Similarly, the number of minority investigators in biomedical research, including HIV, is limited [5, 6]. In 2012, only 6% of principal investigators of National Institutes of Health (NIH) research grants were minorities [7]. Increasing representation of minority investigators in the research workforce may provide better insight on how to

engage underrepresented populations in research and redefine research priorities [8, 9].

The AIDS Clinical Trials Group (ACTG) was established in 1987 by the National Institute of Allergy and Infectious Diseases [10]. The ACTG, whose mission is to decrease the disease burden of HIV, tuberculosis, and viral hepatitis, supports the largest network of HIV/AIDS investigators and clinical trial units worldwide. The ACTG Underrepresented Populations Committee (UPC) promotes and monitors participation of minorities in ACTG studies and administers the Minority HIV Investigator Mentoring Program (MHIMP). The MHIMP is a 1-year, mentored, competitive scholarship that began in 1996 to help minority junior investigators jumpstart their careers as HIV investigators. Here, we report the results of a survey conducted among previous MHIMP awardees, with a focus on research engagement and outcomes.

### METHODS

#### MHIMP Background

The MHIMP was established by the ACTG Executive Committee in 1996 with the goal of providing mentored HIV research opportunities for underrepresented investigators. Investigators affiliated with an ACTG site within 7 years of completing clinical training are eligible to apply. Applicants must have US citizenship or permanent residency (as required by the NIH) and be members of a minority racial or ethnic group underrepresented in biomedical research, as defined by the NIH; that is, American Indians or Alaska Natives, blacks or African Americans, Hispanics or Latinos, Native Hawaiians or other Pacific Islanders [11, 12]. Applicants identify a mentor within their ACTG research site, outline a career development plan for the 12-month award period, and prepare a research concept proposal. Applicants must also demonstrate an interest in HIV/AIDS-related research or its comorbidities, including tuberculosis or viral hepatitis. The program provides 25% of the awardee's salary and 2.5% of the mentor's salary for the award period. MHIMP awardees serve on the UPC and on the ACTG scientific committee that best fits their interests. The MHIMP also supports travel to the annual ACTG meeting, where the awardees network with other ACTG researchers and attend workshops aimed at new network investigators. In general, 2 awards are granted per year.

#### MHIMP Survey

All current and prior MHIMP awardees were asked to complete an electronic survey administered using SurveyMonkey (surveymonkey.com) between fall 2017 and winter 2018, as part of an MHIMP quality improvement initiative. The survey

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consisted of 35 questions that collected information on demographics, affiliation, clinical and research activities, research funding, ACTG involvement, and suggestions for program improvement.

### Research Productivity and NIH Awards

We searched for peer-reviewed research publications authored by MHIMP awardees, beginning with the first postaward year. Publications were identified in the Web of Science Core Collection databases by author name search and collected on May 16–17, 2018. Additional articles were collected from PubMed and Scopus on July 2–5, 2018. If author names were deemed common, available identifiers, affiliations, full name, and initial variations were added to the search criteria. Publications were limited to articles, reviews, case reports, proceedings/conference papers, books, and book chapters. An academic research librarian manually reviewed publications, verified authorship, and removed duplications. We abstracted NIH awards (K, R, and U level) for all MHIMP awardees beginning with the first postaward year, using the NIH Research Portfolio Online Reporting Tools (projectreporter.nih.gov) on July 25–26, 2018.

### Statistical Analyses

We performed data management and descriptive analyses using Stata/MP 15.1 (StataCorp LLC, College Station, TX) and R 3.5.1 (R Foundation for Statistical Computing, Vienna, Austria).

## RESULTS

The MHIMP supported 32 awardees from 1996 through 2017. We obtained contact information for 31 awardees, who were asked via e-mail to complete the survey on October 24, 2017. Two reminders were sent before the survey closed on February 6, 2018. Twenty-two (71%) MHIMP awardees completed the survey (Supplementary Table 1). More than half were 40–49 years old (59%) and male (55%). Reported race categories included American Indian or Alaska Native (14%), black or African American (41%), white (27%), and other (18%). All awardees who self-identified as white and 59% of all respondents reported being of Hispanic/Latino ethnicity. Forty-five percent of respondents had advanced degrees beyond MD or DO (9 MPH/MSc, 1 PhD). Most reported clinical specialization in infectious diseases or HIV medicine (86%), with 18% also specializing in pediatrics. Fourteen percent specialized in neurology or psychiatry. Among respondents, 95% reported currently providing direct medical care. More than two-thirds (68%) reported a current academic rank of Assistant Professor or Instructor, 23% Associate Professor, 5% Professor, and 5% nonacademic rank in industry. Current employment was mostly in academic medical centers (86%).

All but 1 respondent (95%) reported currently performing medical or health sciences research (Table 1), with more than

half (55%) involved in HIV/AIDS, tuberculosis, or viral hepatitis research. Among those currently performing research, 36% reported >50% or full-time research effort. Most reported having received research funding (91%), with 73% as Principal Investigators. Funding mechanisms varied; 18% received R awards or equivalent, 23% received U awards or equivalent, 36% received K awards or equivalent, 36% received industry or

**Table 1. Research Activities Among Awardees of the ACTG Minority HIV Investigator Mentoring Program<sup>a</sup>**

Activity	Total (n = 22)
Performs medical or health sciences research	
Yes	21 (95)
No	1 (5)
Percent time devoted to medical or health sciences research	
Part-time	13 (59)
>50% or full-time	8 (36)
Not reported	1 (5)
Ever funded to perform medical or health sciences research	
Yes	20 (91)
No	1 (5)
Not reported	1 (5)
Funding mechanism(s) ever received (any)	
R award or equivalent	4 (18)
U award or equivalent	5 (23)
K award or equivalent	8 (36)
Intramural award	15 (68)
Industry or private award	8 (36)
Agency funding current research (any)	
National Institutes of Health	10 (55)
Intramural, industry, or private/philanthropic foundation	9 (41)
Not currently funded	6 (27)
Not reported	2 (9)
Current involvement with the ACTG	
Yes	14 (64)
No	8 (36)
Current capacity within the ACTG if involved (any; n = 14)	
ACTG committee/subcommittee leadership	2 (14)
ACTG committee/subcommittee membership	8 (57)
CTU/CRS investigator	9 (64)
Total number of mentees in HIV-related research since MHIMP	
1–5 mentees	15 (68)
6–10 mentees	5 (23)
>20 mentees	1 (5)
None	1 (5)
No. of peer-reviewed publications since MHIMP (n = 32) <sup>b</sup>	
1–10	17 (53)
>10	15 (47)
Transition to independence since MHIMP (n = 32) <sup>b</sup>	
K award within 5 y	4 (13)
K award after >5 y	1 (3)
R or U award within 10 y	7 (22)
R or U award after >10 y	0 (0)

Abbreviations: ACTG, AIDS Clinical Trials Group; CRS, clinical research site; CTU, clinical trials unit; MHIMP, Minority HIV Investigator Mentoring Program.

<sup>a</sup>Values shown are No. (%). Activities labeled “(any)” allowed respondents to choose all that applied.

<sup>b</sup>Values shown for number of peer-reviewed publications and transition to independence since MHIMP include all n = 32 MHIMP award recipients.

private awards, and 68% received intramural awards. Current funding sources included the NIH (55%), intramural, industry, or private/philanthropic foundations. Almost two-thirds of respondents (64%) reported current ACTG involvement. Of these, 64% reported involvement as clinical trials unit/site investigators, 57% as committee/subcommittee members, and 14% as committee/subcommittee leadership. All but 1 respondent (95%) reported mentoring others in HIV-related research after MHIMP completion.

The 32 awardees produced a total of 457 peer-reviewed publications since completing the MHIMP. In the 5 years following their respective awards, 97% of awardees authored peer-reviewed publications, and 13% achieved a K award. Twenty-two percent of awardees achieved R- or U-level funding within 10 years of MHIMP completion.

Opinions about the MHIMP were uniformly positive, with all respondents reporting that they would recommend the MHIMP to other researchers (Supplementary Table 2). Most indicated that the MHIMP helped involve them in the ACTG and network with established investigators (82%). Other responses included that the MHIMP helped awardees start HIV-related research careers (45%), obtain research funding (45%), and publish in an HIV-related field (45%). The most common suggestions for MHIMP improvement were to increase the award duration to 2 years, to increase salary support, and to include investigators within 10 years of completing clinical training.

## DISCUSSION

We found that early-career investigators from minority backgrounds who participated in the ACTG MHIMP successfully launched careers in HIV/AIDS-related biomedical research. Most awardees remained in academia, and many secured research funding and maintained research productivity. Almost two-thirds of past MHIMP awardees remain active as ACTG investigators, and several hold leadership and committee membership positions within the network. These findings underscore the positive impact of the MHIMP on the retention of minority investigators within the ACTG and provide a model for achieving increased inclusiveness in the broader research workforce.

Several components of the MHIMP may have contributed to its success. Awardees became involved with an existing network of established investigators and mentors. MHIMP salary support to awardees was crucial, as minorities face multiple barriers to research success and often have “alternative” pathways that delay their engagement in research [9]. Salary support for mentors, although modest, is a unique feature of the MHIMP. In addition, the MHIMP provided scholars with experience on the UPC and ACTG scientific committees, which encourage awardees to advance the network’s scientific agenda while gaining exposure to protocol development, study team structure,

and networking to promote inclusion of underrepresented populations in trials. In turn, most MHIMP awardees went on to serve in research mentorship roles, which helps foster an inclusive research workforce for the future and reinforces the importance of investing in human resources.

Retention of underrepresented minorities in biomedical research and academic medicine has been modest [6, 13]. Faculty development programs administered at the institutional level have been associated with improved retention of minorities in academia (67%–80% retention among program participants vs 56%–58% among nonparticipants) [14, 15]. We were unable to include a control group of non-MHIMP minority investigators, and consequently we could not assess whether it was the MHIMP specifically that impacted awardees’ career trajectories. However, the substantial proportion of MHIMP awardees conducting biomedical research and working at academic centers (95% and 86%, respectively) and the sentiments of MHIMP awardees about the benefits of the program suggest a positive impact of the program in retaining minority investigators in academic research careers.

There are several areas where the MHIMP could better support awardees and promote inclusion of minorities in research. First, many awardees reported receiving intramural grants, suggesting that most MHIMP recipients require institutional support to achieve independence. This is reflected in the most common recommendations made by awardees to improve the program: to increase the quantity and duration of support and to increase the eligibility period. Second, future directions for the program should be to include other underrepresented populations such as sexual and gender minorities and investigators with disabilities. Third, the program should continue to foster collaborations within the ACTG, expand to other HIV/AIDS clinical trials networks, and integrate with existing career development programs that target minorities at different stages of their career development [8].

In summary, MHIMP awardees have remained engaged in academic research careers and as active participants in the ACTG network, having secured research funding and mentored younger generations of researchers. There is a dearth of minority investigators at the NIH, and the MHIMP has served as a pipeline for fostering the careers of future minority investigators that helps fulfill the NIH priority to increase representation and diversity in biomedical research.

## Supplementary Data

Supplementary materials are available at *Open Forum Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

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