Rationale and Design of the Women and Inclusion in Academic Medicine Study

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Background and Objective: Women of color (WOC) (African American, Hispanic, Native American/Alaskan Native, and Asian American) faculty remain disproportionately underrepresented among medical school faculty and especially at senior ranks compared with White female faculty. The barriers or facilitators to the career advancement of WOC are poorly understood. The Women and Inclusion in Academic Medicine (WIAM) study was developed to characterize individual, institutional and sociocultural factors that influence the entry, progression and persistence, and advancement of women faculty in academic medical careers with a focus on WOC.

Methods: Using a purposive sample of 13 academic medical institutions, we collected qualitative interview data from 21 WOC junior faculty and quantitative data from 3,127 (38.9% of 8,053 eligible women) respondents via an online survey. To gather institutional data, we used an online survey and conducted 23 key administrative informant interviews from the 13 institutions. Grounded theory methodology will be used to analyze qualitative data. Multivariable analysis including hierarchical linear modeling will be used to investigate outcomes, such as the inclusiveness of organizational gender climate and women faculty's intent to stay.

Conclusion: We describe the design, methods, rationale and limitations of one of the largest and most comprehensive studies of women faculty in academic medicine with a focus on WOC. This study will enhance our understanding of challenges that face women, and, especially WOC, faculty in academic medicine and will provide solutions at both the individual and institutional levels. *Ethn Dis.* 2016;26(2):245-254; doi:10.18865/ed.26.2.245

Introduction

The entry and career progression of women in the sciences and in academic medicine has gained considerable concern in the current landscape of the medical and scientific workforce.[1] Several programs of national scope reflect the concerns of preeminent federal agencies and professional associations regarding the status of women in the sciences and in academic medicine. The 1994 Office on Research in Women's *Health Workshop Report, Women in Biomedical Careers Dynamics of Change* delineates several career barriers for women, including: lack of female role models and mentors, limitations in career paths and rewards, family responsibilities and dual roles, sex discrimination and sexual harassment, gender sensitivity, and racial bias.[2] A 2007 interim report of the National Institutes of Health (NIH) Working Group on Women in Biomedical Careers noted that the number of research project grants per principal investigator is higher for males than females.[3] The National Academies *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering* report states that "for women to participate to their full potential across all science and engineering fields, they must see a career path that allows them to reach their full intellectual potential."[4]

Several programs have been ini-

tiated to address the barriers for women in science. Examples include: Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers sponsored by the National Science Foundation; the NIH Building Interdisciplinary Research Careers in Women's Health program; and career and mentoring programs sponsored by organizations such as American Association for the Ad-

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vancement of Science, Association of American Medical Colleges, Association for Women in Science and a wide range of programs available at individual academic institutions.

Most of these initiatives, however, have not focused on the careers of women of color (WOC - African American, Hispanic, Native American/Alaskan Native, and Asian American female faculty) and their even more persistent underrepresentation among senior biomedical scientists and academic medical faculty in particular. The lack of attention to and specific focus on WOC is a gap that our study can potentially fill. The Women and Inclusion in Academic Medicine Study (WIAM) was developed to characterize the institutional, individual and sociocultural factors that influence the entry, progression, persistence and advancement of women faculty, with a focus on WOC, in academic medical careers. The aforementioned programs provided essential information that contributed to the study's overall framing and its design. It is anticipated that new insights from WIAM could inform the development of promising intervention strategies. The purpose of this article is to detail the rationale and design of WIAM.

Design

WIAM is an interdisciplinary, mixed-methods, multi-institutional research study. To better understand the spectrum of issues for women in academia and provide a robust context for examining WOC in academic medicine, the scope of the study included all women faculty regardless of race and ethnicity. The study's four aims were to: 1) Characterize academic medical institutions in terms of institutional structure, mission, promotion and tenure policies and faculty support, especially for WOC; 2) Characterize individual, institutional and sociocultural factors that influence the entry, progression and persistence of women and WOC in academic medical careers; 3) Determine the career trajectories of WOC in academic medical careers; and 4) Elucidate the interplay between individual, institutional, and sociocultural factors as they relate to women's career outcomes.

To address the aims, the study was organized into two components and four phases: 1) an institutional assessment (phases 1 & 2); and 2) a faculty assessment (phases 3 & 4). The phases included quantitative and qualitative parts and were executed between September 2009 and June 2014 at 13 partnering medical institutions in the United States and Puerto Rico. The purpose of the institutional assessment was to identify factors that characterized academic medical institutions in terms of institutional structure, mission, promotion and tenure policies, and faculty supports. Phase 1 of the institutional assessment was conducted through an online survey completed by institutional liaisons. Phase 2 included structured interviews with key administrative informants. For the faculty assessment, phase 3 involved a qualitative investigation using faculty interviews. The purpose was to provide contextual insights into what faculty saw as impeding or supporting their progress in academic medicine. Phase 4 was a quantitative investigation using an online survey distributed to all female faculty. The purpose was to understand the range of individual, institutional

Table 1. Description of key variables in conceptual framework

Institutional factors describe the context within which faculty work	Human resource activities: position descriptions, hiring, promotion and tenure policies, support systems for women in academic medicine, support systems for minority faculty and history of women of color as faculty
	Differentiation between access discrimination and treatment discrimination as they relate to hiring and subsequently job performance and promotability[5]
	Organizational culture and constraints
	Professional support, include career-enhancing, psycho-social:
	- Formal and informal mentoring and sponsorship opportunities[6, 7]
	- Coaching and career feedback[8]
	- Inclusion in formal and informal networks[9]
Individual factors account for the characteristics that faculty bring to the organization	Self-efficacy, as it affects adjustment to organization and role orientation[10]
	Self-management of one's career/career strategies[11] and proactive behaviors as a dispositional approach[12]
	Interpersonal conflicts, perceived workload, stressors and resilience[13]
	Socio-economic status and debt burden
	Training and time of first academic medicine appointment
Sociocultural factors address racial and ethnic subgroups and women	Gendered roles[14, 15]
	Simultaneity of the ascribed characteristics of race and gender[16]
	Perceived race/ethnicity[17]
	Perceived discrimination[18]
	Levels of racism: institutionalized, personally-mediated and internalized[17]
	Self-efficacy, stereotype threat
Career trajectory refers broadly to the performance and progression issues	Career interruptions (on/off ramp)[19]
	Time at rank
	Number of grants
	Number of publications
	Awards and recognitions

and sociocultural factors that influence faculty career progression, advancement and trajectories, as well as the interplay among them.

The study was conducted by Converge: Building Inclusion in the Sciences through Research, which is the research and evaluation arm of the Harvard Medical School Office for Diversity Inclusion and Community Partnership. We collaborated with the Center for Gender in Organizations, located at Simmons College School of Management.

Conceptual Model

The study was organized around a conceptual framework that proposed a series of relationships between race, organizational experiences and career outcomes adapted and expanded from Greenhaus et al.[5] The key variables in the model include institutional, individual and sociocultural factors related to career trajectory and career outcomes. Table 1 provides a sample of the conceptual measures and indicators that illuminate each factor and are

indicative of the topics, issues and questions that the study addressed.

Population and Study Sample

The 13 partner institutions were sampled purposively to provide a diverse group of key institutional characteristics (Table 2). The selection criteria included geographic location, size and structure, minority-serving institution status, percentage of WOC faculty, and institutional research intensity. Additional criteria included: established

relationships between the research team and administrators and a designated institutional liaison. Three collaborating sites—Howard University College of Medicine, University of Massachusetts Medical School, and University of Medicine and Dentistry of New Jersey–New Jersey Medical School—served as pilot sites for developing and testing data collection instruments. Designated institutional contacts were identified at these sites.

For phase 1, a total population sample of partner institutions was used and institutional liaisons completed the online survey. In phase 2, a purposive sample of 30 individuals in offices that dealt with faculty development, diversity, and/or women affairs and who were willing to be interviewed about their offices and the broader medical school were identified by institutional liaisons. Upon contact by the program manager, 24 agreed to be interviewed by a member of the research team, one of whom requested that the interview not be recorded. Twenty-three interviews were transcribed for analysis.

In phase 3, a purposive sample of 31 WOC faculty at the rank of assistant professor or lower were identified for junior faculty interviews by institutional liaisons at the 13 partner institutions. Of the 31 women contacted by the program manager, 25 agreed to be interviewed, and 24 completed interviews. Of those, two interviews were omitted due to technical problems with recording, and one participant withdrew, for a total of 21 interviews transcribed for analysis.

Table 2. The 13 primary partner institutions in the WIAM study, 2012[a]

Case Western Reserve University of Medicine
Charles Drew University of Medicine and Science
Duke University School of Medicine
Harvard Medical School
Meharry Medical College
Morehouse School of Medicine
Mt. Sinai School of Medicine (Icahn SOM)
Stanford University School of Medicine
University of California San Francisco School of Medicine
University of Connecticut School of Medicine and Dentistry
University of Nebraska College of Medicine
University of New Mexico School of Medicine
University of Puerto Rico School of Medicine

a. The response rate ranged from 26.7% to 46.9% among the institutions

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In phase 4, institutional liaisons provided a sample frame for their respective organizations of women faculty eligible for promotion. A total population sample of 8,053 eligible women faculty from across the 13 partner institutions were invited by email to participate in the study. Faculty who were no longer employed at the institution or could not be reached, either because of an incorrect email address or other error, were excluded from the sample frame (n=12). In total, 3,184 faculty (40%) clicked the survey link, which resulted in a final sample, after data cleaning of 3,127 faculty (38.9%). Most respondents (85%, n=2,591) indicated that their primary appointing department was a clinical department and 11% (n = 321) were based in a basic science department. More than half indicated their primary work setting as a hospital (51%, n = 1,569), followed by medical school (34%, n = 1,049), health center/office/clinic (12%, n = 366) and research

units (1%, n =40). The majority of the respondents (84%, n=2,578) reported full-time work status.

Materials and Methods

The Harvard Medical School institutional review board approved the study. For those partner institutions whose IRB offices required separate approval, applications were submitted and approvals secured.

Instruments

Phases 1 and 2: Institutional Assessment

Online Institutional Survey - Phase 1 quantitative

An Institutional Profile protocol was created that included uniform definitions for data on faculty and student demographics, awards, history and mission, strategic plans, institutional policies, and descriptive history. This protocol was used

to collect information through an online survey from the 13 partner institutions, thus, ensuring standardization of the data collected. The protocol was pilot-tested with institutional liaisons who provided feedback about its content, structure and procedures to collect data.

Key Administrative Informants Interviews - Phase 2 qualitative

Using a structured interview guide, we collected information about various policies, programs offered and services provided by various offices within the medical schools. A combination of open and closed questions included: 1)What is your role in this office? What is your title?; 2) How do you identify the needs of those you serve?; 3) What services/activities does your office currently provide?; 4) For faculty targeted, approximately what percentage utilizes the programs/services/activities offered by your office?; and 5) How are current faculty made aware of programs/services provided through your office?

Phases 3 and 4: Faculty Assessment

To develop the instruments for both the qualitative and quantitative components, focus groups with WOC junior faculty (n = 14) and interviews with senior faculty (n = 5) were conducted at the three collaborating sites. The focus group guide contained questions related to entry, persistence, and progression to capture the unique experiences of women in academic medical settings as distinct from other settings. The specific questions included: 1) When and why did you enter academic

medicine?; 2) What helps you persist in your academic medical career?; 3) Are you currently seeking advancement in an academic medical career?; 4) Are there factors within the institution that make it easy/difficult for you to feel fulfilled in your work?; and 5) Is there anything else that we have not covered that you would like to share with us today?

To gain the perspectives of senior faculty, we conducted separate phone interviews, asking the same questions of senior women faculty from each collaborating site. This strategy negated the possibility of junior faculty responses being inhibited by the presence of senior faculty in the focus groups.

Focus groups and interviews were scheduled by the program manager and conducted by research team members. Consent was implied during recruitment. Written informed consents were obtained for the interviews and focus groups. Each site scheduled a junior faculty focus group and 1-2 interviews with senior faculty; each site received $500. Each participant received $50 for her time.

Junior Faculty Interviews - Phase 3 Qualitative

A semi-structured interview guide was used to gain insights into what faculty saw as impeding or supporting their progress in academic medicine. An open-ended question was posed: "We are constructing a survey for a study of the advancement of women of color in academic medicine, and we want to be sure we include the most important issues that may affect that advancement. In your experience, what fac-

tors, personal and/or institutional, are most significant in impeding or supporting your own progress?"

Online Faculty Survey - Phase 4 Quantitative

The survey was developed using the web-based program Research Electronic Data CAPture system (REDCap). It included closed and open-ended questions. Survey items were based on validated scales and instruments as well as from interview and focus group data. The survey comprised 12 sections: degrees; work activities; training; work history in academic medicine; career outcomes; pursuing your career; organizational context; factors that influence professional life; mentoring; demographics; family and caretaking responsibilities; organizational supports.

The survey was pilot tested at the three collaborating sites by eight faculty (junior and senior). Feedback from the pilot test was used to refine the survey instrument. The most frequent comment was that the survey was too long, which resulted in shortening the survey.

Data Collection

Data for all four phases were collected at the 13 partner institutions. The section below describes the procedures for each phase.

Phases 1 and 2: Institutional Assessment

Online Institutional Survey - Phase 1 Quantitative

Questions were programmed into SurveyMonkey and a link was

Table 3. Definition of variables and measures

Broad Domains	Institutional profile	Junior faculty interviews	Focus groups/ interviews	Pilot testing	Full survey
Individual					
Degrees				X	X
Work activities		X	X	X	X
Training				X	X
Work history in academic medicine			X	X	X
Career outcomes				X	X
Pursuing your career		X	X	X	X
Mentoring				X	X
Demographics				X	X
Institutional					
Organizational context				X	X
Factors that influence professional life				X	X
Organizational supports				X	X
Institutional descriptors	X				
Institutional leadership	X				
Faculty overview	X				
Trainee/fellow overview	X				
Student overview	X				
Assessments and research	X				
Policies	X				
Programs and offices	X				
Awards and recognitions	X				
Sociocultural					
Family and caretaking responsibilities				X	X

sent to each liaison, as well as a hard copy of the questions to facilitate the data completion process. No consent was solicited as institutional, publicly available data were collected.

Key Administrative Informants Interviews-Phase 2 Qualitative

Key informant interviews were scheduled by the program manager and conducted by a research team member in offices that dealt with faculty development, diversity, and/ or women, though a few represented offices that dealt more broadly with health disparities, residency, faculty affairs, and academic affairs. Questions focused on publicly available and/or non-confidential information about the mission, origin, programs, policies and other relevant factors to the offices in question. The list of questions was sent in advance to allow interviewees the time needed to obtain specific information requested. Consent was implied during recruitment. Informed consent was elicited verbally prior to the start of the phone interviews.

Twenty-three interviews were transcribed via a professional transcription service, reviewed by the program manager and any errors or missing words were corrected. Corrected transcripts were coded and blinded for coding and analysis using NVivo 9 software.

Phases 3 and 4: Faculty Assessment

Junior Faculty Interviews - Phase 3 Qualitative

Phone interviews were scheduled by the program manager and

conducted by a research team member. Consent was implied during recruitment and informed consent was elicited verbally prior to the start of the phone interviews. All calls were recorded for later transcription, if permission was given. A total of 21 interviews were recorded and transcribed. Transcripts were blinded and coded for data analysis using NVivo 9 software.

Online Faculty Survey - Phase 4 Quantitative

We sent an announcement email to all women faculty at the partnering institutions. The email announced the study, alerting recipients to a future email that would contain the formal survey invitation and provided us an opportunity to verify email addresses. The survey was launched in three waves to better accommodate the needs of institutional partners. The first wave of six schools launched in March 2012; the second wave of five schools launched in April 2012; and the last wave of two schools launched in June 2012. The final date for completion of survey data collection at all 13 institutions was October 10, 2012. Before each launch, liaisons were sent a tracking sheet to verify faculty emails. Once these materials were disseminated and a more accurate list of current faculty obtained, email addresses were imported into REDCap and the survey was launched. Survey validation codes were provided so participants could continue with the survey at a later stage. To ensure confidentiality all validation codes and email addresses were de-

stroyed once the data were downloaded, thereby severing any link between a respondent's identifying information and survey responses. Table 3 contains a summary of the study variables and measures. Faculty who clicked on the survey link were directed to a consent page that elicited consent through the question "do you consent to participate in the survey?" Those who provided consent were directed to the survey.

Analytical Plan

Qualitative and quantitative data were collected across the four phases and integrated in the analysis. The qualitative data collected in phase 3 was coded according to each factor raised by respondents and then organized into themes. Codes and themes were reviewed by three reviewers for consistency and grouped into four categories that take into consideration intersectionality (simultaneous consideration of gender and race/ethnicity): 1) those found associated with both female (without regard to race/ethnicity) and minority status (without regard to gender); 2) those associated with race but not gender; 3) those associated with gender but not race; and 4) those related to being a WOC. A grounded theory methodology[20, 21] was used to analyze the qualitative data.

The quantitative analytical approaches are designed to address the study's aims and will utilize a variety of statistical approaches. Descriptive statistics will be computed at the individual (from phase 4) and the institutional levels (from phases 1 & 2). This includes estima-

tion of univariate summaries (eg, faculty characteristics) and also the association parameters of faculty-level or institutional-level covariates with outcomes. Faculty perceptions will be analyzed using hierarchical linear modeling with fixed effects to account for non-independence of observations within institutions (ICC=.02). For example, as an outcome variable, institutional gender inclusiveness will be measured using a composite scale of eight items (alpha=.86). Perception of gender inclusiveness will be regressed on institutional type (minority serving vs predominantly White institutions), awareness of women's affairs offices, and relationships at work, the work-family interface and socio-demographic characteristics. A series of two-way interactions with post-hoc tests will be estimated to examine differential associations between institutional factors and gender inclusive environment for different groups of women by race-ethnicity.

Another analysis will involve bivariate associations of intent to stay with faculty and institutional characteristics using chi-square tests (categorical characteristics) and F-tests (continuous characteristics). Explanatory factors will be divided into three groups representing demographics, job dissatisfiers and job satisfiers. A series of generalized logit models in each will be estimated. A final model will include the statistically significant (at P = .10) covariates from each group of covariates. Within-institution correlation among respondents will be accounted for through the inclusion of an institutional random intercept.

Sensitivity Analysis

To increase the robustness of and confidence in the results, sensitivity analyses will be conducted.[22] This will involve analyzing the data with/without potentially influential conditions and conducting appropriate tests to increase the confidence of the validity of primary analyses.

Missing Data

We assume missing responses were missing at random.[23] Survey items with missingness of >30% were eliminated from our imputation and subsequent analyses whereas multiple imputation procedures were used to address missing data for items missing <30% using the IVEware software package.[24] Each completed dataset was analyzed using standard procedures and then the estimates and standard errors were combined across the five completed datasets using Rubin's rules.[25] The survey sample (n=3,127) contains imputed data for 348 variables. The frequency of missing observations for imputed variables ranged from .1% to 29.7%.

Influential Observations and Distributional Assumptions

The effect of influential observations such as outliers (extreme value on a dependent variable relative to values on independent variables) and influential points (extreme values on a single or combination of independent variables) will be determined by removing observations systematically and then collectively from models. In extreme cases, the use of robust regression will be considered.

Where variable distributions deviate substantially from a normal distribution, log transformations will be performed to address positive skews and square and cubic transformations for negative skews.

POTENTIAL LIMITATIONS

One of the major challenges to the study is the logistics of working with multiple institutions of higher education and the associated varied

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contexts and fears of expressing opinions. However, the deans or associate deans of partner institutions were enthused about participating in this study because it would provide them with needed summary information to enhance their working environments, support the career development of minority women faculty, and enable them to engage in an effective network to share and exchange ideas about programmatic initiatives. They were committed to providing supports that facilitated the logistical tasks of faculty interviews and survey administration, including multiple

IRB approvals for which the process varied greatly across institutions.

This study, involving both institutional and faculty assessment, provided cross-sectional data. The data collected represent a single point in time so factors related to future or prior professional experiences were not captured in this study. As a snapshot, this may not represent the fullness of faculty's career experiences.

Other potential limitations include the use of self-reported data in both faculty interviews and the online survey. For example, all the data collected, including objective measures such as number of publications and number of grants received, are self-reported. Due to time and financial constraints, there are no formal plans for triangulation/verification of the self-reported data. Further, there may be important biases in the respondents vs the non-respondents that could influence the study findings.

While the 13 partner institutions represent approximately 10% of US medical schools, they were not selected to be a representative sample, but rather, a non-random purposive sample and the data collected are from a subset of institutions. This may limit the study's generalizability.

At a technical level, the initial web survey suffered from freezing, crashing, abruptly terminating sessions, and severe slowness with page loading and branching logic that may have influenced response rates. One significant issue that resulted from this problem is that many respondents, either because they were forced out by the system or because they quit after slow page

loading, did not reach the point of the survey where key demographic questions were asked. This meant that many of the women had not reached any race or ethnicity questions. The potential limitation of these missing data was addressed through multiple imputation.

DISCUSSION

We have designed what is currently one of the largest and most comprehensive studies of women faculty, with an emphasis on WOC. The study gathers perceptions of individual, institutional, and sociocultural factors affecting career advancement in academic medicine of these women faculty. Approximately one-third of all medical school faculty are female, and among all female faculty <25% are WOC and <10% are underrepresented minority faculty in medicine. As the diversity of the US population grows, it is expected that increasing numbers of WOC will enter the academic medical ranks. Hence, a study that systematically collects and analyzes data will provide understanding of the barriers and facilitators to career advancement. Given the paucity of information about WOC in academic medicine, the WIAM study is essential to help direct and inform individual and institutional strategies to optimize the career success of members of this group of faculty. The WIAM study is unique because it addresses WOC in the broader context of women in academic medicine. In addition, the study uses mixed quantitative and quali-tative methods to capture reasonable estimates of perceived barriers and facilitators to career advancement and the associated contextual issues.

Despite its limitations, the WIAM study provides one of the most robust sources of quantitative and qualitative data on perceived individual and institutional level facilitators and barriers to WOC career advancement. Thus, this study provides a framework and a "road map" for how future studies might be conducted and will bring a new level of understanding to the institutional, individual and sociocultural factors that influence the entry, progression, persistence and advancement of women, particularly women of color, faculty in academic medical careers.

AUTHOR CONTRIBUTIONS

Research concept and design: Hill, Normand, Norris, Reede; Acquisition of data: Hill, Wake, Reede; Data analysis and interpretation: Hill, Carapinha, Normand, Wolf, Norris, Reede; Manuscript draft: Hill, Wake, Carapinha, Wolf, Norris, Reede; Statistical expertise: Hill, Carapinha, Wolf, Reede; Acquisition of funding: Hill, Normand, Reede; Administrative: Hill, Wake, Normand, Norris, Reede; Supervision: Hill, Carapinha, Normand, Norris, Reede

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