

Appendix I: Systematic Literature Review of Survey-Based Research on DEI Characteristics in Higher Education

For this systematic review, we searched Web of Science, Google Scholar and PubMed to find all peer-reviewed articles published by the end of December 2023. We used Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement guidelines (Liberati et al. 2009). The details of our keywords search are as follows:

("diversity" OR "equity" OR "inclusion" OR "DEI" OR "survey" OR "social sciences" OR "STEM" OR "chemistry" OR "physics" OR "math*" OR "Engineering" OR "business" OR "business school" OR "medicine" OR "residency program" OR "higher education" OR "program director" OR "program coordinator" OR "program chair" OR "dean")

Our systematic review results are below:

Article Information	Academic Program (Fellowship)	Purpose and Methods	Conclusion(s)
Healthcare Total: 14			
Williams et al. (2023)	(Radiation Oncology)	Purpose: In order to better understand potential implications on residents who are underrepresented in medicine (UIM) in radiation oncology (RO), this study looked into the attitudes and behaviors of US radiation oncology (RO) program directors (PDs). Methods: A 28-item survey was created with the help of DEI leaders in RO, the validated Ethnic Harassment Experiences Scale, and the Daily Life Experiences subscale.	Only a small percentage of PDs reported receiving complaints of racial discrimination suffered by UIM residents, and the majority of PDs stated that they did not think UIM residents were treated differently in their department due to their race or ethnicity. These statistics contrast resident experiences and point to a discrepancy between resident experiences and DEI views among US RO PDs that should be addressed through improved programmatic action and evaluation.
Bose et al. (2022)	(Vascular Surgery)	Purpose: The purpose of the current study was to identify the factors of poor DEI in vascular surgery training programs by using the DES with program directors. Method: All program directors and assistant program directors of vascular surgical training programs (residency and fellowships) in the United States received an anonymous electronic survey.	Program directors who were not men and those who had encountered discrimination at their institution were much more likely to discover that it had a poor DEI.

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Cheng et al. (2021)	(Nuclear Medicine)	<p>Purpose: The objectives of this study were to characterize the current situation of women and that are underrepresented in medicine in The United States (URiMs) in academic nuclear medicine (NM), to describe the demographics of professors and trainees in NM residency programs approved by the Accreditation Council for Graduate Medical Education (ACGME), and to evaluate the degree of exposure to NM in medical school.</p> <p>Method: 41 ACGME-accredited NM residency program directors (PDs) in the United States received an email with a 15-item online survey</p>	<p>Underrepresented groups in NM training programs include women and URiMs. In leadership positions, this diversity deficit is even more prominent and more noticeable. When compared to NM faculty members, a higher percentage of NM trainees are foreign medical graduates, which may indicate a decline in NM recruiting of American graduates. Less than one third of academic institutions that provide NM residency programs include NM in their medical school curricula, usually near the end of medical school. In particular for women and URiMs, increased and earlier exposure to NM may promote recruitment and reduce diversity gaps.</p>
Bhasin et al. (2021)	(Cardiology)	<p>Purpose: Assess the current demographic landscape of underrepresented-minority (URM) applicants, fellows, and faculty for ACGME-accredited fellowship programs and determine how program directors value various approaches to increasing diversity.</p> <p>Methods: Web-based survey emailed to 250 program directors – 28% (71) response rate.</p>	<p>While the majority of responses (85.9%) support diversity as an important initiative in cardiology fellowships, program directors remain uncertain about how to incorporate this value into the admissions process. There were two additional majority findings from responses:</p> <ul style="list-style-type: none"> - Program directors supported multiple approaches to increase diversity - Emphasized fellowship programs as having the highest responsibility to increase diversity in cardiology
Crowley et al. (2020)	(Cardiology)	<p>Purpose: Identify cardiology fellowship program and associate program director perception(s) of barriers to increasing diversity in their field.</p> <p>Methods: Web-based survey sent via email to 513 program or associate program directors (193 unique programs) – 21% (110) response rate representing 57% of all unique cardiology training programs.</p>	<p>Although lack of diversity in cardiology has been previously identified in literature, 63% of respondents did not believe there was an issue with the diversity in their programs. For the respondents seeking to increase diversity, most were uncertain how to do so in an effective manner. The primary barriers identified in responses to increasing diversity were: lack of familiarity with diversity literature, lack of agreement for need to increase diversity, lack of prioritization, and indifference to diversity-educated recruiting.</p>
Damp et al. (2020)	(Cardiology)	<p>Purpose: Understand the current perceptions of diversity, barriers to diversity, and potential solutions among cardiovascular disease (CVD) specialty program directors.</p>	<p>General agreement regarding importance of increasing diversity amongst CVD fellowship directors – however, overall program fit of candidates remains highest consideration regardless of diversity for acceptance.</p>

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		Methods: Survey sent via email to all CVD fellowship program directors (237) – 58% (138) response rate.	
Potts et al. (2021)	Family Medicine	Purpose: Assess the current national status for reported discrimination in educational and clinical environment with consideration of diversity and inclusion efforts. Methods: Survey distributed to 522 program directors as part of overall CERA survey – 52% (272) response rate for diversity section (compared to 57% total).	Responses indicate that programs with more diverse residents had higher levels of discrimination – while most programs have some type of process to address discrimination and/or bias events, program directors do not find these effective. Overall, programs with a URM leader were more likely to have a diverse resident population – indicating a relationship between program leadership as important to increasing diversity.
Rosendale & Josephson (2017)	Neurology	Purpose: Conduct needs assessment among neurology residency programs to identify and address any existing gaps in curriculum. Methods: Survey distributed via email to all accredited 130 neurology program directors – 36% (47) response rate.	In general, cultural responsiveness was identified as important but 85% of respondents acknowledge this type of training is missing from their program. The most commonly identified barriers as to why this type of training was not incorporated were time, lack of expertise, and lack of educational material availability.
Mendiola et al. (2021)	OB-GYN	Purpose: First known effort to address the gap in literature regarding characterizing URiM recruitment efforts for OB-GYN residency programs. Methods: Survey emailed to all 253 accredited OB-GYN program directors – 22% (56) response rate.	Upon completion of the first national OB-FYN program assessment of URiM recruitment efforts, researchers found leveraging demographic data to inform interview offer and face-to-face interactions as most prominently leveraged diversity in recruitment approaches. The most significant barrier was identified as the lack of faculty diversity (and in overall applicant pool).
Aguwa et al. (2021)	Ophthalmology	Purpose: Evaluate the current URM recruitment and diversity education initiatives among ophthalmology residency programs. Methods: Web-based survey distributed via email using to all ophthalmology residency program directors (~188) – 34% (63) response rate.	Integrating diversity considerations in recruitment strategies was most commonly done by holding URM-specific information sessions and events, special review of URM applicants, and mentorship programs for URM students. The most commonly identified diversity curriculum barriers were not identifying a barrier, lack of time to implement and teach initiatives, and lack of faculty expertise to educate students.
McDonald et al. (2020)	Orthopedic Surgery	Purpose: After identifying a gap in literature for why orthopedic surgery has seen minimal increases in diversity, authors sought to gain program director perspectives regarding barriers to improving diversity within their program.	Lack of existing minority faculty was most commonly identified as the significant barrier to diverse applicants matching to their program. Other key findings were programs with higher numbers of URM residents had higher numbers of URM faculty – with URM residents

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		Methods: Survey distributed electronically to 155 allopathic orthopedic surgical residency program directors and coordinators – 48% (75) response rate.	representing 17.5% of all resigned/dismissed residents even though URM residents represent only 6% (on average) of all residents over the past 10 years (p. 4).
Newsome et al. (2018)	Otolaryngology	Purpose: Assess the racial diversity amongst otolaryngology programs and identify areas for opportunity to improve recruitment. Methods: Web-based survey sent via email to 105 program directors – 30% (32) response rate.	Analytic results from this study were found the only significant association to be between the number of URM faculty and URM residents matriculated – identifying a large opportunity to increase recruitment efforts for all programs since this surgical specialty previously identified as having one of the lowest numbers of URM residents.
Lee et al. (2020)	Psychiatry	Purpose: Understand the perceptions and demographics of the American Association of Directors of Psychiatric Residency Training (AADPRT) members. Methods: Web-based survey distributed via email to all 657 AADPRT members in the U.S. and Canada – 39% (256) response rate.	Although responses cover less than half of total members, AADPRT found that 62% of program directors are female, while 61% of practicing psychiatrists are male. Collectively, racial/ethnic minorities only accounted for less than 30% of all respondents – with 9.38% declining to answer.
Mattes & Deville (2021)	Radiation Oncology	Purpose: Understand how residency-program affiliated radiation oncology faculty engage female and URiM medical students. Methods: Web-based survey sent to all 83 radiation oncology residency program directors affiliated with on-site medical school – 65% (54) response rate. Note – program directors given option to designate different respondent, so 23 responses came from medical student directors.	A key finding of this study was the lack of educational outreach to women and minority students by radiation oncology departments with a residency program – only about a quarter of respondents specifically engaged with diversity initiatives for recruitment of medical students.
Business Total: 7			
Beer et al. (2023)	Business	Purpose: This study’s goal was to evaluate faculty perceptions of diversity, equality, and inclusion (DEI).	According to the results, the majority of participants concur that college stakeholders understand the value and necessity of equity and that the college is committed to DEI values. However, the majority of teachers do not understand the college or university's recruitment and

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		<p>Method: The authors use survey data from academic members in the College of Business at a 4-year U.S. institution.</p>	retention tactics and believe that their school does not have a culture of equity.
Smith et al. (2021)	Business	<p>Purpose: Quantify and analyze trends in DEI-related case studies and case studies with diverse protagonists among educational materials used in business schools.</p> <p>Methods: Leading case study publishers were identified for case study extraction based on the following search criteria: underrepresented minorities, minorities, URMs, Black, African American, Hispanic, Latino, Latinx, disability, women, gender, immigrant, refugee, asylee, etc. 215 cases were selected for both DEI-related studies and diverse protagonist studies.</p>	For both focus areas of case studies reviewed, gender was the largest diversity-related consideration. Researchers identified multiple gaps in educational case studies used by business schools implicating the case study authors and faculty themselves, business school education, and case study publications. Without increased consideration for integrating more diversity case study material into education the gap will persist.
Moshiri & Cardon (2019)	Business	<p>Purpose: Fill the identified gap in literature of a nationwide survey among business school deans to identify which strategies to increase faculty diversity are most effective.</p> <p>Methods: Survey distributed to 317 AACSB-accredited institutions – 16% (52) response rate. Survey questionnaire designed to solicit responses on business school diversity characteristics and policies.</p>	The author-identified most compelling finding from the survey responses is the “importance of establishing positions of authority at the university and the college levels to guide diversity efforts and track progress” – however this approach is not widely adopted (p. 122). The remaining best practices evaluated did not provide substantial data for conclusions.

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Moshiri & Cardon (2016)	Business	<p>Purpose: Address the identified gap in studies examining how business school deans understand the underrepresentation of racial/ethnic minorities among faculty and what those causes might be.</p> <p>Methods: Surveys distributed via email to 280 business schools – 20% (55) response rate.</p>	Business school deans most frequently identify competition and the market as reasons for persisting underrepresentation of racial/ethnic minorities in full-time faculty positions – but also attribute underrepresentation to lack of qualified candidates as well. Authors recommend further research to identify the barriers experienced by underrepresented professors and graduate students in order to better understand potential differences in perceptions of deans.
Buttner et al. (2007)	Business	<p>Purpose: Due to the known underrepresentation of racial/ethnic minority faculty in AACSB-accredited business schools but lack of research conducted to understand leadership perceptions and strategies for addressing this gap, the authors seek to evaluate the relationship between racial awareness of business school leaders and addressing underrepresentation.</p> <p>Methods: Survey sent via mail to business school leaders at 658 U.S. AACSB member schools – 22% (143) response rate.</p>	Competition was most recognized as the driving factor for underrepresentation of faculty of color in business schools. Racially aware leaders identify systemic factors for underrepresentation whereas less racially aware leaders were not as likely to highlight these factors – rather, emphasis was placed on individual performance over systemic factors. (*Recognized by Moshiri & Cardon (2016) as first study of all faculty of color in business schools)
Belhadjali et al. (2007)	Business	<p>Purpose: Assess the level of engagement among AACSB-accredited business schools with diversity initiatives and evaluate if there is a difference based on mission statement.</p> <p>Methods: Survey distributed via email to 320 business schools – 22% (69) response rate.</p>	Primary approaches towards integrating diversity initiatives are through recruiting and support of a diverse student body and faculty. Overall, authors conclude that AACSB-accredited business schools are working to increase diversity in their programs.
Levsen et al. (2001)	Business	<p>Purpose: Test the assumptions of previously accumulated research conclusions regarding DEI aspects of business school faculty and search process for new hires.</p> <p>Methods: Surveys sent to 125 AACSB-accredited business schools in U.S. and Canada and responses received from administrative managers representing 57% response rate (71) at the university level.</p>	Based on responses, there were two statistically significant findings: <ul style="list-style-type: none"> - Gender: White males were significantly more likely to hold management-level or power positions (e.g. dean) in private schools than women. - Race/ethnicity: Universities offering graduate degrees more likely to have a racial/ethnic minority as the dean or administrator than universities that do not offer graduate-level business degrees – but

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			overall, racial/ethnic minorities were less likely to hold the higher-level academic jobs.
STEM Total: 3			
Stockard et al. (2021)	Chemistry	<p>Purpose: This study offers proof of racial, ethnic, and gender disparities in graduate school experiences and career goals of PhD candidates in the top 100 ranked departments within the STEM field of chemistry.</p> <p>Method: The University of Oregon Human Subjects Office reviewed the study of the ACS data and determined that it was exempt. In order to examine relationships between variables measured at two levels of study (individual students and their departments), they employed mixed-model regression analyses, a potent statistical technique.</p>	According to the findings, graduate students who identified as belonging to a racial or ethnic group that has historically been underrepresented in the field of chemistry (known as an underrepresented minority, or URM) were much less likely than other students to say that their financial support was enough to meet their needs. Additionally, they were less likely to say they had helpful interactions with postdocs and peers. Significantly fewer women, and particularly URM women, reported having a supportive relationship with their advisors.
Potvin et al. (2017)	Physics	<p>Purpose: Establish a nationally representative understanding of the deterministic factors in doctoral-level admissions to physics programs.</p> <p>Methods: Survey sent via email to 185 physics departments – 170 individual responses representing 75% response rate (149 universities).</p>	About one-third of the responding programs do not consider diversity-related factors during the admissions process (neither race/ethnicity nor gender). Among the programs that do weigh diversity considerations, seeking available funding via fellowship was the most commonly identified approach – with minimal applications from underrepresented students being called out.
Bielefeldt et al. (2017)	Engineering	<p>Research Question: Are those from historically underrepresented groups in engineering teaching ethics in ways that are comparable to or distinct from those of their majority peers? Topics, courses, and teaching techniques are contrasted by gender, race/ethnicity, nationality, and engineering/computer science in comparison to other fields.</p> <p>Methods: Quantitative data were provided for the study through two nationwide online surveys. In the first survey, the opening questions related to teaching ethics in the classroom; in the second, they</p>	Examining the survey data revealed that instructors from diverse racial and ethnic groups choose different ethics-related subjects to teach engineering students. For instance, URM faculties are more likely to teach students about social justice in curricular contexts than faculty from majority groups, and female faculty are more likely to do so in courses and other settings. In-class discussions, introspection, and in-class debates were employed by more women than men, with some gender differences in the approaches used to teach ethics.

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		related to teaching ethics in extracurricular activities.	
Social Sciences Total: 3			
Hightower & Johnson (2019)	Social Work	<p>Purpose: Evaluate how BSW programs educate students about social justice and diversity, in which contexts these materials are presented, and any subsequent effects (e.g. once in workforce)</p> <p>Methods: 108 program directors were contacted via phone about the study and sent a web-based survey via email post-phone call – 33% (36) response rate.</p>	The most prudent finding of this research is the lack of consistent and similar approach among BSW programs for teaching and integrating social justice and diversity in the undergraduate academic materials. Due to the emphasis of BSW’s accreditation body, CSWE, regarding social justice and diversity, authors conclude that accreditation organizations might not have a practice role in facilitating individual programs meeting their emphasized goals based on the wide variation in approaches and responses.
Gabel & Mapp (2019)	Social Work	<p>Purpose: This study surveyed bachelor's and master's level social work programs throughout the US in order to determine the breadth and depth of human rights education being taught in the social work curriculum, the types of methods being used to teach human rights in social work education, and the factors that influence the methods being used.</p> <p>Methods: All U.S. MSW and BSW program directors' email addresses were acquired from the CSWE website. BSW program directors made up the majority of respondents (54%), followed by MSW program directors (27%). Deans or people who indicated multiple jobs (such as the director of a BSW program and faculty for an MSW program) were the majority of those who identified as Other (15%). To best gather the data, different types of responses to questions were allowed, including Likert scale, Guttman scale, frequencies, and open-ended.</p>	While social justice and human rights are taught in three-fourths of the social work programs surveyed in the US, social justice is more widespread in the curricula and is a faculty member's area of specialty. The likelihood of including material on social justice and human rights in all necessary courses and in courses covering cultural diversity and policy was highest.
Beimers et al. (2013)	Social Work	<p>Purpose: The racial and cultural diversity of baccalaureate social work (BSW) programs was explored in this study, which largely looked at student enrolment, faculty perceptions of diversity, and measures to draw in new students.</p>	The findings show that social work programs' levels of racial and ethnic diversity vary generally. However, BSW programs in remote locations typically include fewer students and staff members who are of different races or ethnicities. Directors of BSW programs

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		Methods: The program directors of Midwestern states' BSW programs were surveyed. 42 programs gave their responses.	acknowledge the problem of a lack of diversity, but efforts to address it have only had sporadic success.