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COMMENTARY

Mentorship Interventions Across Career Stages in Biomedical & Health Sciences Fields

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Introduction

This 2024 Special Issue, Volume 8, Issue 1, of *The Chronicle of Mentoring & Coaching* titled "Mentorship Interventions Across Career Stages in Biomedical & Health Sciences Fields" presents cutting-edge research, evaluation of mentorship interventions across career stages, and new tools related to mentorship, coaching, and leadership practices in biomedical and health sciences. This special issue is the third of its kind highlighting work from researchers funded by the National Institutes of Health (NIH) - Diversity Program Consortium (DPC) (https://diversityprogramconsortium.org/). The previous special issues were published in BMC Proceedings (2017) and Understanding Interventions (2020).

In 2012, the NIH Working Group on Diversity within the Director's Advisory Committee provided recommendations about how to develop and support individuals from diverse backgrounds across the lifespan of a research career. Their focus included researchers from the undergraduate level to acquisition of tenure in an academic position or equivalent within a non-academic setting (NIH Draft Report). In response, the NIH implemented the DPC in 2014 as a national collaborative to advance knowledge regarding how to enhance diversity in the biomedical research workforce. The DPC focused on the development, implementation, assessment, and dissemination of innovative and sustainable approaches to student engagement, training and mentoring, faculty development, and institutional research training infrastructure (Hurtado et al., 2017). The DPC included three integrated initiatives in response to the cited diversity imbalance: Building Infrastructure Leading to Diversity (BUILD) (Davidson 2017), the Coordination and Evaluation Center (CEC), and the National Research Mentoring Network (NRMN) (Sorkness et al., 2017).

Ten BUILD grants were awarded to eligible institutions to implement and study innovative approaches to engage and retain students from diverse backgrounds in biomedical research and focused on student, faculty, and institutional development activities simultaneously (NIGMS 2022). The DPC CEC at UCLA conducted the Enhance Diversity Study (EDS), a multi-site, national, longitudinal evaluation of BUILD program outcomes from annual faculty surveys linked with site programmatic records (McCreath et al., 2017). NRMN Phase 1 was a cooperative agreement between the National Institute of General Medical Sciences (NIGMS) and led by leadership of five academic institutions directing Administrative, Mentorship and Networking, Mentor Training, Professional Development, and Research Recruitment and Outreach Cores. The NRMN collaborated with diverse stakeholders from the DPC consortium, including BUILD and non-BUILD institutions, to work synergistically to implement cross-Core initiatives (Sorkness et al., 2017). The DPC NRMN Phase 2 is funded by NIGMS as a U24 NRMN-Coordination Center (CC) whose mission is to catalyze and support synergistic interactions among the U01 Research Project principal investigators and team members of eleven NRMN Science of Mentoring Interventions and a U24 NRMN Resource Center that houses MyNRMN, a mentoring, networking, and professional development platform launched with the goal of enabling engagement and connectivity to build a personal network of mentoring connections (Ahmed et al., 2021).

Across the 15 manuscripts accepted for this Special Issue, four themes emerged which are highlighted and described in detail below.

Expanding Mentorship Interventions

Several articles in this Special Issue describe exciting interventions at DPC BUILD programs which fall under the umbrella of mentorship training. These include workshops, activities and tools aimed at improving research mentoring relationships, and career mentoring. Foroozesh et al. describe an 8-hour summer mentor training workshop with three 1-hour follow up workshops across the year. This training, implemented and studied at a Historically Black College & University (HBCU), incorporates core competencies from the published *Entering Mentoring* curriculum (Pfund et al., 2015) and adds participant-suggested topics such as self-affirmation and growth and fixed mindsets in mentoring. Wayman et al. describes a pilot mentoring program which connects 2nd year STEM undergraduates from traditionally underrepresented groups (URGs) with mentors from a broad array of STEM professions. To facilitate their mentoring sessions, mentors use a career-focused mentoring curriculum, extracted and

adapted from *Entering Mentoring*. Dr. De Lacalle and colleagues studied two semester-long faculty trainings, one in mentoring and one in course based undergraduate research (CUREs). Finally, Vargas et al. describe a training consisting of four antiracist-anticolonial professional online training modules and activities meant to educate mentors in liberatory race-conscious mentorship skills as a path to student empowerment. Beta-testing and evaluation of these mentorship interventions show promising results.

Testing Existing Interventions

The DPC provides an amazing opportunity to test mentorship interventions with more diverse groups and in varied contexts. The DPC has also provided a chance to explore research questions using larger and in some cases longitudinal datasets. Several of the papers in this Special Issue demonstrate how researchers capitalized on this opportunity and are described below.

More Diverse Participants and Contexts

To examine mentor training at more diverse institutions, Dr. Kelly Young and co-authors implemented and studied an evidence-based, multi-modal mentor training program (Young et al., 2021) across five Minority-Serving Institutions (MSIs). In addition, Maritza Salazar Campo and co-authors describe an investigation of network mentoring across five Research Centers in Minority Institutions (RCMIs) in the context of a previously published grant writing coaching program for early career biomedical researchers (Weber-Main et al., 2020). Collectively, the results from these studies show promise for these interventions yielding impact in new, more diverse settings and offering the opportunity to learn more about what works for whom and in what context.

Large Datasets with Longitudinal Data

When researchers can collect longitudinal data from larger, more diverse groups of participants, it affords the opportunity to deepen understanding through more complex analyses. In this special issue, Dr. Ahmed Syed and colleagues from the NRMN Resource Center explore the impact of engaging in the MyNRMN virtual mentoring platform across 20,000 mentors and mentees from almost 4000 institutions. The goal was to understand mentee growth and "transitions" alongside MyNRMN engagement with mentoring and networking resources. Using Higher Education Research Institute (HERI) survey data from ten DPC BUILD programs, McCreath *et al.* were able to investigate the impact of mentor training on undergraduate STEMM students' outcomes utilizing propensity score matching with longitudinal data. Institutional data, collected from 2015 to 2018 at a Hispanic Serving Institution (HSI), were utilized for a study reported by Echegoyen *et al.* to demonstrate the positive impact of a 3 course-based freshman research experience on both 4-year undergraduate program retention and 4-year graduation rates. Finally, Murrell et al. identified mentoring competencies that were independently associated with mitigating the impact of social unrest due to systemic racism as part of a cluster randomized trial conducted at 25 institutions between 2020-2024. Diverse postdoctoral fellows and early career faculty participated in this trial; those who identified as female reported higher psychological distress as a result of social unrest.

Importance of Prepared Facilitators to Implement Intervention

Several articles described interventions which were implemented for small groups by trained facilitators, describing the important role of facilitators. For example, Laird et al. highlight the critical role of the facilitator creating psychological safety (PS) for participants in a randomized controlled study of a group peer mentoring intervention. PS enabled faculty to be authentic, vulnerable, and responsive, and to develop social bonds within the community; qualitative analysis outlined the identified themes. House et al. studied the impact of the previously published Culturally Aware Mentoring (CAM) training using an online implementation approach with a more extensive national sample and enrolling a more diverse population of mentors than the pilot study (Byars-Winston et al., 2018). These authors reported the importance of CAM facilitator preparation to reach the desired outcomes of the NRMN U01 intervention. Additionally, Young et al. captured feedback from HU undergraduate participants in the BUILD Advancing Inclusive Mentoring (AIM) program with one stating that an intervention facilitator could "make or break" the program. Finally, Avila et al. investigated the motivations, benefits, and challenges for facilitators of peer group mentoring to conduct this intervention. Advancing the diversity of the workforce in academia and giving back to other UR biomedical researchers were reported as top motivators for facilitators. The primary challenge was time.

New Validated Mentoring Assessment Instruments

Applications

Three articles describe new, revised, or new applications of assessment instruments to better understand mentoring. Hall et al. shared the psychometric properties of a survey instrument designed for mentees to rate the quality of the mentorship received by their primary research mentor, across 5 areas: Intellectual Growth and Development, Professional Career Development, Academic Guidance, Personal Communication and Serves as a Role Model. Disparities in mentee

experience in women and individuals from groups underrepresented in medicine were noted and the authors emphasize the need for continued efforts. Wiskur et al. described a study using the paired 21-item version of the Mentoring Competency Assessment (MCA) (Hyun et al., 2022) across multiple institutions to evaluate mentorship competencies from the perspectives of both mentors and mentees. Results highlight the subjective elements inherent in mentor competency evaluations. The authors suggest ideas for longitudinal studies of the mentor-mentee dyad to better identify precise training needs to enhance mentoring.

Summary

This Special Issue of *The Chronicle of Mentoring & Coaching* highlights critical areas of work needed to advance the science of mentorship and to contribute to institutional culture change. These include expanding mentorship interventions and testing existing interventions with more diverse participants and contexts. Work included also highlights the need to train those implementing interventions and new measures needed to assess mentorship. Authors of the articles included in this Special Issue share evidence-based approaches to training and persistence in biomedical research. Psychological and social factors identified in these studies mitigate individual and institutional barriers to workforce diversity. Importantly, further efforts must be continued to initiate and evaluate generalizable and scalable strategies to effectively disseminate and sustain diversity within the nationwide scientific workforce. This issue collectively attends to the current research on mentorship and identifies needs and areas for next steps.

Acknowledgement

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