Current Status and Future Strategies for Mentoring Women in Neurology

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Abstract

The American Academy of Neurology’s (AAN) 2017 Gender Disparity Report identified improving mentorship as a key intervention to fill the leadership and pay gaps for women in neurology. Here we summarize the literature on mentoring women, provide an outline of ideal components of programs geared toward closing gender gaps, and present a mentoring program for AAN members. The strategies discussed share similarities with those for closing gaps related to race, ethnicity, and religion. Developing effective mentorship and sponsorship programs is essential to ensure a sufficiently diverse pool of academic faculty and private practitioners and to establish equal representation in leadership roles in this field.

Introduction

Mentorship is beneficial for career and life development and encompasses interactions and partnership between a mentor, who provides multifaceted support and guidance, and a mentee, who seeks knowledge, advice, and expertise.1,2 An ideal mentor can help, guide, direct, and influence a mentee while also identifying his or her own areas of improvement. Together with institutional support, both mentor and mentee strive to achieve a shared vision of the mentorship relationship.3 Dedicated time for mentoring is challenged by clinical, research, and administrative demands, and women more often report difficulty in finding mentors.4 Despite mounting evidence for the benefits of mentorship at all career stages, the lack of an effective framework that effectively supports mentees with diverse backgrounds, while providing protected time for mentors, persists. Moreover, sex and gender minority individuals (e.g., nonbinary, LGBTQ+) (SGM) and physicians belonging to groups that are underrepresented in medicine (URM) likely face a similar lack of support.

The American Academy of Neurology (AAN) Gender Disparity Task Force’s report and recommendations highlighted mentorship as a critical component of rectifying gender gaps in neurology.5 These recommendations included formal mentor training for current leaders and offering mentorship training as part of AAN’s educational programming.5 This narrative review highlights the benefits of mentoring, addresses the current gender gap in mentorship in neurology, reviews current national women-specific mentorship and sponsorship initiatives, and makes recommendations to establish mentorship programs for women and other underrepresented groups.

Benefits of Mentoring in Academic Medicine

The benefits of mentorship are highlighted in table 1. Mentoring has a strong influence on academic performance, research interests, and interest in academia.6 As neurology has one of the highest rates of burnout among medical specialties,7 mentoring in neurology can help build mechanisms to avoid or overcome burnout. Residents who participated in a mentorship

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program had decreased stress, emotional exhaustion scores, and levels of depersonalization, as well as higher personal achievement scores and improved quality of life.6,7 Similar findings were reported in a review showing that mentorship positively affects health and well-being.8 Successful mentorship also contributes to higher faculty retention.9 Furthermore, successful mentorship programs establish pipelines of mentors by increasing the odds of a mentee becoming a mentor.10

Models of mentorship vary according to the number of participants, the structure (formal, informal), the roles of mentor and mentee (dyadic, multiple), the approach (apprenticeship, team, peer, or senior-to-junior mentoring), and method of delivery (distance, virtual, or face-to-face) (table 2).1,11 There are few evidence-based conclusions on the effect of mentorship or guidelines on best practices.

**Mentorship in Neurology**

In neurology, more than 60% of residents attribute their choice of residency to a mentor.12 Informal mentorship can be established through AAN’s Student Interest Group in Neurology, present at most medical schools and similar programs.12 An example of a longitudinal mentorship program is Comprehensive Opportunities for Research and Teaching Experience, where mentorship begins as early as the first year of medical school.13 This program significantly augmented the number of students matching into neurology and increased the students’ academic productivity during medical school while providing guidance on the residency application process.13 Mentorship is important at all career levels, and many national organizations recognize this through programs such as the AAN’s Director Mentorship14 and the American Neurologic Association’s MentorLink.15

**Gender Gaps in Neurology: Need for Women-Specific Mentorship in Neurology**

Despite roughly equal numbers of men and women entering medical school, women occupy fewer high-ranking academic positions compared to their male peers: this is a problem termed the "leaky pipeline." The leaky pipeline in medicine is most evident in the loss of women at a higher academic rank (i.e., associate and full professors).16 This has resulted in disparities along the professional continuum and an evident inequality within all major metrics of academic success, including compensation,16 publication rates,17 grant funding,18 and society-level or national recognition19 despite similar clinical and academic productivity.9,20 Regardless of the physicians’ experience and productivity, based on Medicare reimbursements, they are reimbursed less.20 Another specific example of similar productivity between men and women fulltime faculty that had a gap in compensation is a study in internal medicine where work allocation, grants funded, abstracts accepted, and publication rate were similar among women and men, but compensation received by women was less than men ($72,000 vs $79,600; p < 0.001).21

Within these broader categories, specific gaps have been identified. Women give grand rounds less frequently,22 serve on fewer medical journal editorial boards,23 receive less funding on initial NIH grants,18 and spend, on average, more time on parenting and domestic activities19 than their male peers. In one study analyzing NIH grantees, men who previously had NIH grant funding were likely to have a higher application and success rate than women of similar career stage, despite grant funding being generally similar.24 Whereas medical school has been roughly evenly split across gender lines, in 2018 the American Association of Medical Colleges (AAMC) reported that, across clinical subspecialties for well over a decade, women accounted for 58% of instructors and 46% of assistant professors, but only 37% of associate professors and 25% of full professors.25

Neurology has exhibited some of the most considerable disparities.26 Women compose 51% of students going into medical school and compose an increasing proportion of the physician workforce,27 yet continue to occupy a disproportionately low number of senior faculty positions.26 AAMC’s most recent data indicate that only 12% of neurology departments are chaired by women.25 Female representation in medicine has been ~40% since the 1990s. However, female leadership is lacking, signaling that the pipeline, although intact, is not moving towards leadership as frequently as expected. The lack of female leadership is linked to gender inequality in compensation, such that the wage gap in neurology is one of the largest among the medical specialties, where women make roughly ~15 cents less per dollar, after adjusting for several factors including age, years of experience, specialty, faculty rank, NIH funding, clinical trial participation, PubMed indexed publications, and Medicare payments.29 Male neurologists were twice as likely to be professors compared to female neurologists when controlling for years since medical school graduation and clustering at the facility level.30 First and last author publications in several high-impact neurology journals, including Neurology®, also demonstrate a publication gap, with women publishing less than expected when considering the proportion of all neurologists who are female.31 AAN’s national recognition and achievement
Mentorship has the potential to narrow these gaps. In a review of 20 studies on gender-stratified academic medical mentorship programs in the United States, same-gender mentors may offer advantages in career planning specific to women, such as timing maternity leave and guidance on time management. It can be postulated that the leaky pipeline may improve with better mentorship for junior and mid-level women faculty. There is an opportunity for organizations like the AAN to address the mentoring needs of women, SGM, and URM physicians.

**Women, URM, and SGM: Similarities and Implications**

URM are defined as “racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general population.” SGM are individuals who “identify as lesbian, gay, bisexual, transgender, or queer.” In neurology, there is a notable lack of data on the impact of mentorship for URM or SGM physicians. Similarities among women, URM, and SGM include underrepresentation at the assistant, associate, and full professor level. In a survey of department chairs in neurology, 65% of departments had fewer than 10% URM faculty. In another study to estimate the proportion of AAN members and their identified gender that sampled 1,000 AAN members, with a response rate of 13.5%, 10% identified as gay, lesbian, or bisexual, with most of them being open about their identity at work.

In addition to academic underrepresentation, there are notable race- and ethnicity-based gaps in promotion and compensation and harassment. URM physicians face unique challenges in job obligations and duties and in battling stereotypes.

**Table 1** Mentor and Mentee Benefits From Mentorship

| Mentors | Mentees |
|---------|---------|
| Stronger perception of career success, personal satisfaction | Higher job satisfaction |
| Reciprocal benefits with mentees | Greater employment well-being |
| Organizational recognition with potential organizational incentives | Higher career personal satisfaction |
| Improved retention due to relationships established | Academic productivity |
| Intellectual stimulation | Greater research protected time |
| Positive relationships with residents and faculty members | Faster rate of promotion |
| Personal satisfaction | Enhanced confidence, self-efficacy, and self-esteem |
| Improved job satisfaction | Learning to be a mentor |
| Renewed sense of purpose | Networking and increased professional visibility |
| Faster promotion rate, more noticeably by their superiors | Decreased burnout |
| Opportunity for increased salary derived from additional responsibilities | Improved health and well-being and overall quality of life |
| Less likely to burn out | Faculty retention |

**Table 2** Forms of Mentorship

| Forms of mentorship | Description or features |
|---------------------|-------------------------|
| Dyad                | One mentor to one mentee |
| Peer                | When senior mentors are in short supply, peer faculty mentor each other |
| Facilitated peer    | Senior supervising mentor to oversee a group of peer mentees |
| Speed               | Brief meeting between mentees (10 minutes) and mentors to jump start further mentoring relationships but does not often result in long-term mentorships |
| Functional          | Specific project for which a mentee is mentored |
| Group               | Mentor facilitates group discussions usually in a conference setting |
| Distance            | Involve mentors outside of one’s institution |
women and URM, experience burnout, all of which contribute to the "leaky pipeline." The “intersecting identities,” when an individual identifies with multiple underrepresented groups, add another layer of complexity in providing support for SGM, URM, and women. For example, gay women of color may face a “triple disadvantage” that can affect compensation, career development, and relationships with colleagues. Awareness of these unique situations is key to adapting mentorship methodologies especially since intersectional classifications contributed to the difficulty in searching for a mentor because some mentors may be amenable to racial differences but have a bias towards SGM. More specific issues on mentorship that exist among URM and SGM are beyond the scope of this article, but we highlight parallel issues among women, URM, and SGM.

**Women-Specific Mentorship Programs: Primary Components and Lessons Learned**

Mentorship programs explicitly geared towards women result in a high level of satisfaction and positive impact on promotion and retention in academic medicine. Nineteen unique mentorship programs were included in a recent review, 15 of which were developed specifically for female physicians, while 10 of the 19 had exclusively female faculty mentors. In this review, gender concordance was not highly valued when selecting mentors, emphasizing that men can play important roles in these programs and in the pursuit of closing the gender gaps. Another aspect of professional development where mentorship is needed is in tackling imposter syndrome, wherein someone has doubts about their competency, ability, and qualifications, despite being accomplished. This syndrome is ultimately associated with lower motivation to have an academic career, poor career planning, and a decreased drive to pursue leadership opportunities because of feelings of inadequacy.

Institutionally, one way to address the gap in mentorship for women is the assignment of a faculty mentor or a mentorship committee to trainees and junior faculty, ensuring equal access to mentorship. Successful approaches include incorporating women-specific faculty development programs, where topics surrounding career development, research, promotion, conflict management, communication, supervision, time management, teaching, and ethical issues can be discussed. In a recent work analyzing the utility of an individualized, longitudinal institutional mentoring program for junior faculty women, high satisfaction was reported from both mentors and mentees. Workshops aimed at developing women’s career and research skills are also beneficial. Early-career women-mentorship programs focused on enhancing teaching skills, grant and manuscript writing, and development of scientific presentations, alongside institutional support via access to biostatisticians and research stipends, should also be considered.

**Table 3 Key Features for a Successful Mentorship Program With Unique Considerations for Women and Underrepresented in Medicine (URM)**

| 1. Design inclusion of all key stakeholders: mentor, mentee, department and institutional diversity committee leadership (if available), institutional leadership, and include provision of policies, training, and other interventions to address specific women and URM concerns regarding recruitment, retention, and career development. |
| 2. Department involvement in pairing mentors and mentees and requesting mentees to share their specific short-term and long-term goals of mentoring with regular mentor and mentee meetings and 360° evaluations. |
| 3. Mentees having an option of self-selecting mentors based on alignment of professional goals and strengths or choosing mentors outside of division/department chief to minimize conflict. |
| 4. Institutional recognition of mentoring activities as part of the following: a. Academic promotion portfolio b. Financial recognition: calculating relative work value equivalent for time devoted to formal mentoring activities c. Mentorship awards. |
| 5. Recognition of research by underserved populations and minority health disparities and crediting the URM faculty appropriately for this research. |
| 6. Establishing a formal mentor development program including structured curricula specific for women and URM including training opportunities for early career. |
| 7. Collaborating across departments and allocating resources at an institutional level. |
In medicine, components of a strong mentorship relationship include reciprocity, mutual respect, clear expectations, personal connection, and shared values.\(^{57}\) Primary components of a strong mentorship program that may also apply to SGM are shown in table 3. The figure summarizes the key factors that influence a successful women-specific mentorship program.

Formalized mentorship programs can lead to further development of positive talent and leadership capable candidates, while improving stability\(^{58}\) and promoting gender equity.\(^{8}\)

The first step to formalizing a mentorship program is identifying key stakeholders in the mentorship process (table 4). This may involve a representative from the promotions and appointments committee or human resources who can provide information about how taking leave would affect the promotion or tenure process. Diversity committee representatives should address societal, personal, and professional concerns and cultivate a diverse and representative workforce. Such infrastructure allows mentees to focus on finding a mentor that meets their needs by aligning their short- and long-term goals with the pool of mentoring resources available.

The second step is initiating mentor training through the institution, rooted in best practices and the establishment of metrics that can track a mentee’s progress. Financial and time commitment from the department for mentorship is critical to ensure programmatic success. Education value units (EVUs), measured in hours, can represent a nonclinical contribution to the department and may include mentorship as an expected contribution to the institutional education mission.\(^{59}\) The Medical University of South Carolina initiated such a system in their institution to measure educational contributions accurately. EVUs were time-based, objectively easy to count and equate with clinical productivity measures, and associated with departmental educational activities. The University of Colorado’s model included accounting for the relevance of the educational activity (level 1 lowest impact, level 3 highest impact) and the time spent per year (20, 20–40, and 40 h/y).\(^{61}\)

Their model included mentorship as one of the baseline metrics. Not only does the establishment of EVUs potentially protect the time of mentors to perform their necessary duties, but it also lends legitimacy to the mentor role.\(^{59,62}\) Ten hours annually has been reported to be an estimated expected time obligation for mentorship.\(^{59}\) Mentorship must be rewarded so that mentors’ efforts are incentivized, possibly similar to teaching, research, and clinical rewards.\(^{12}\) Capitalizing on technological supports available for teleconferencing can expand opportunities for mentoring beyond the walls of individual institutions, providing networking opportunities that may more effectively align with individual mentees’ needs.\(^{63}\) Engaging in individual mentoring at a regional or national level can foster academic productivity and build long-term personal and professional alliances, with the added reward of a heightened sense of professional satisfaction.\(^{64}\) The same rationale behind promoting mentorship for women applies to all underrepresented groups.

**Mentorship Program Components**

A formal mentorship program specifically for women at an institutional level allows for the development of curricula to
Table 4 Considerations for Women, Underrepresented in Medicine (URM), and Sex and Gender Minorities That Affect Mentorship Approach

| Institutional | Sociocultural | Personal |
|--------------|---------------|----------|
| • Maternity leave | • More clinical responsibilities | • Feeling of isolation |
| • Tenure “stop clock” | • Serve patients in underserved communities | • Stereotyped |
| • Serve patients in underserved communities, less time for research | • Promotion rates slower | • Difficulty with cross-cultural relationships |
| • More clinical responsibilities | • Unaware of the role of mentorship | • Experience stereotyping, racist remarks, overt and covert bias, discrimination |
| • Unaware of the role of mentorship | • Prevalent impostor syndrome |                  |
| • Prevalent impostor syndrome | • Financial hardship |                  |
| • Lack of role models | • Stigma due to participating in affirmative action programs |                  |
| • Low or mediocre expectations | • “Window dressing” to fulfill URM requirement for recruitment |                  |

navigate specific challenges that reach beyond the bounds of individual departments, an example of which is the formal, mentor-development program structured curriculum piloted at the University of California, San Francisco, in 2006.665

For organizations with limited bandwidth to support a multiyear structured program, speed mentoring programs offer a more flexible option for mentors and mentees. Many of the AAN’s leadership programs, including the Women Leading in Neurology program, operate in this way, with 1 or 2 in-person meetings accompanied by multiple digital check-ins throughout the year. Furthermore, the advent of social media provides a distinct platform for expanding personal networks and exploring meaningful mentorship for women physicians in a much more expansive and effective way.666

Examples of Women-Specific Mentorship Programs Among Neurologic Subspecialties
Nationally, several neurologic societies and other neurology groups have organized women-specific mentorship programs. Examples include the Women in Neurocritical Care (WINCC) mentorship program, the Women Mentoring Excellence in Neurology (WoMEN), the International Women in Multiple Sclerosis (iWiMS), and the Women in Neuro-Oncology (WiN) mentorship working group.

Women Mentoring Excellence in Neurology
The WoMEN pilot program is a collaboration between the Women’s Issues in Neurology section of the AAN and the Women Neurologist Group Facebook group. It is currently in a pilot year and has matched 127 mentor/mentee pairs. WoMEN was created to be a 1-year near-peer mentoring program for women neurologists at all career levels. Residents are matched with fellows or individuals who just completed their training, junior faculty members are paired with midcareer neurologists, and so on. Mentor/mentee pairs are matched on similar subspecialty interests, shared demographics, and specific characteristic requests. The program is in its inaugural year and outcome assessment is pending.

Women in Neurocritical Care
The WINCC mentorship program was created and developed by the Neurocritical Care Society (NCS) WINCC section.667 Launched in 2019, the WINCC coordinated with the NCS trainee section mentorship program, establishing 7 mentor/mentee multidisciplinary pairs for 2019. Each pair received monthly emails of applicable discussion points and came up with a project. Pairs submitted a progress report a few months before the end of the mentorship year. The WINCC mentorship program also initiated a speakers list that promotes speaker diversity by providing connections to a diverse panel of available speakers for organizations in need.

International Women in Multiple Sclerosis
The key aims of this initiative are to “support and inspire women working in MS clinics and research.”668 This paradigm “unites clinicians and researchers committed to advancing scientific discoveries and improving care for people with MS and related disorders.”668 While the organization was founded by women, meritocracy, diversity, parity, and ingenuity in MS research and patient care for individuals of any background are the focus of iWiMS advocacy. More than 28 peer groups and 80 mentor/mentee pairs have already been created. With such high demand, identifying sufficient numbers of mentors has been an ongoing challenge.666

Women in Neuro-oncology
The Society of NeuroOncology669 formed the WiN subcommittee in 2018, with the primary mission to provide multifaceted support to women through education, mentorship, funding, and data collection.669 This subcommittee consists of neuro-oncologists from various practice settings.

Ongoing Challenges Facing Mentorship of Women in Neurology
Role of Gender Concordance in the Perpetuation of Gender Being a Factor in Career Development
The importance of gender concordance in mentorship varies. There is variability depending on the mentee’s role.2 From the faculty perspective, according to one study, although most mentors were men, 80% of the women faculty reported that...
gender concordance was not important when selecting a mentor. On the other hand, women residents were likely to choose a same-sex mentor due to the perception that the same-sex mentor will be more understanding. Mentorship outcomes such as the number of publications or percentage of time spent on research are not influenced by gender concordance.

Role of the #MeToo Movement in the Mentorship of Women by Men

The #MeToo movement brought to light the social inequities associated with gender. In health care, there is a push to improve organizational structures, processes, and outcomes toward the goal of eliminating gender-related harassment and discrimination. An unintended consequence of this movement is a hesitation for men to mentor women, with the possible perpetuation of gender inequity. This movement should not deter men from mentoring women because of the fear of a sexual misconduct accusation. It can be argued that it is an obligation as physicians to train physicians the same way that a physician has an obligation to treat all patients regardless of gender. As part of self-reflection and analysis of their fears surrounding the #MeToo movement, men should familiarize themselves with what sexual harassment encompasses if they are unfamiliar with the concept and avoid engaging in it. It is critical for men to continue to support and mentor women and to stand with them in this movement and at the same time view interactions as mentors with the concept of agency and responsibility as an opportunity for open dialogue, self-reflection, and system-wide change.

Open Questions and Future Directions

A lack of scientific rigor in most mentorship research with inconsistent follow-up, no comparison groups, and variable usage of validated assessment measures has resulted in incomplete information on how best to mentor women in academia. Nonetheless, most programs use an approach where participants need to opt into the program and devote time and attention to it (a “bottom-up” approach). Understanding similarities of women, URM, and SGM, although briefly touched upon in this review, was not extensively discussed. A gap of research into URM, SGM, and intersecting identities and the impact on a physician’s career and psychosocial development in the setting of mentorship exists. There is a lack of demographic data to enable the foundation of this gap.

One concept receiving increasing attention is sponsorship and the concern that women can be overmentored and undersponsored. Men are 46% more likely than women to have a sponsor and, as a result, are much more likely to obtain leadership positions. Interestingly, 46% of women respondents in the Harvard Business Review study chose men as sponsors for reasons including better connections and network; they are perceived to be more powerful and “know how to succeed.” In neurology, processes to facilitate structured sponsorship for women are lacking. This is another gap to explore to support professional development among women neurologists.

Despite nearly even proportions of men and women applying to and matriculating in medical schools for well over a decade and a half, women are poorly represented throughout all measures of clinical and academic achievement, even after accounting for time since completion of training. This disparity is mirrored in academic neurology, highlighting a need for better career development efforts focused on women and other underrepresented populations. Research on mentorship demonstrates benefits on academic advancement and faculty retention, both essential needs for ensuring equitable representation of women in neurology. Formal mentoring programs in neurology departments should be available in all career stages for women, URM, and SGM. AAN’s mentoring initiatives should be expanded and other subspecialty societies must be encouraged to follow suit. Positive trends are welcome; further work remains to be done.

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