



Mentoring for diversity and inclusion in pediatric radiology: nurturing the next generation of physicians from underrepresented minorities

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Abstract

The increasing recognition of the need for a diverse workforce as a tool for excellence in medicine has fortified the efforts toward recruitment, retention and development of faculty from racial and ethnic minorities. Despite these efforts, individuals of Black, Hispanic, American Indian and Alaska Native, Native Hawaiian and other Pacific Islander backgrounds remain vastly underrepresented in the radiology workforce. The main impediments to increasing their representation are an insufficient pipeline and the long time required to train a pediatric radiologist. A greater representation of minorities can only be achieved through the enduring nurturing of future pediatric radiologists along every step in the professional life cycle of a physician, from high school through fellowship completion. Restructuring of faculty recruitment and faculty development policies is also required. A key component of faculty development and overall wellness is mentorship. Junior faculty, particularly those from racial and ethnic minorities, benefit from the experience, advice and support of more experienced radiologists. Successful mentorship is key to ensuring that staff from underrepresented backgrounds thrive within their institutions and in turn become successful mentors to younger individuals, thus completing a virtuous cycle of minority mentorship.

Keywords Diversity · Faculty development · Mentoring · Pediatric radiology · Underrepresented minorities in medicine

Introduction

The point is to get your work done, and your work is to change the world.

— James Baldwin

In recent years, the medical and radiology communities have focused on increasing diversity of their workforce [1]. Despite a growing body of evidence outlining the benefits in patient care and the potential financial advantages derived from a diverse talent pool, racial and ethnic minorities continue to be vastly underrepresented among practicing radiologists in the United States [2, 3]. Pediatric radiologists interact closely with children and their families, and serve

an increasingly diverse patient population. Pediatric radiology is well positioned to reap the benefits of diversifying its physician workforce. However, changing the demographics of practicing radiologists is a difficult task that requires sustained and structured efforts over a long period of time. Support from leadership of scientific societies, medical schools and hospitals is required to slowly change the racial and ethnic composition of our specialty.

The success of diversity and inclusion efforts hinges on identifying opportunities and addressing challenges. Framing the problem in terms of the life cycle of a physician is useful because it allows for identification of possible intervention points. For example, the Association of American Medical Colleges (AAMC) consistently reports that the number of racial minorities is already low at the time of matriculation into medical school; this clearly points to the need to build a more robust pipeline to attract and retain individuals from minority backgrounds starting as early as high school and college [4]. These efforts should be paired with changes in the admission criteria to medical school and residency programs so that they incorporate diversity and equity in selection as concrete goals. Similarly, faculty recruitment and promotion should be examined in light of

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evidence that indicates lower rates of promotion for staff from minority backgrounds [5]. At the individual level, mentorship is a fundamental intervention to positively impact trainees and faculty who are already in our departments [6]. A substantive change in the composition of the radiology workforce requires a combination of system-based changes and one-on-one support through mentorship.

In this manuscript we review the state of racial and ethnic diversity in pediatric radiology, specifically the challenges to the construction of a more diverse workforce, and outline concrete interventions that can mitigate these challenges. We place a special emphasis on the role of mentorship as an effective and multidimensional strategy to nurture the next generation of physicians from racial and ethnic minorities.

Underrepresented minorities in medicine

The term underrepresented minority (URM) was first used by the AAMC nearly 5 decades ago. The current definition was introduced in 2004 to describe individuals in medicine who are underrepresented relative to their number in the general (United States) population. From the racial categories recognized by the United States Census Bureau (both the 2010 Census and the recently performed 2020 Census), physicians who are Black or African American, American Indian and Alaska Native, or Native Hawaiian and other Pacific Islander are considered URMs [7, 8]. The Census recognizes the “Hispanic or Latino” ethnicity as a concept that is independent of race. Physicians whose ethnic background is Hispanic or Latino are also considered URMs, independent of their race; for example, a White physician whose ethnicity is Latinx would be considered a URM.

Few studies have investigated the racial and ethnic composition of the radiology workforce. A 2014 study by Chapman et al. [3] queried several publicly available data repositories (AAMC, Electronic Residency Application Service, Accreditation Council for Graduate Medical Education) and reported that while URMs (collectively) accounted for approximately 30% of the population (2010 United States Census), only 5.8% of practicing radiologists were from a URM background [3]. When stratifying these data by the specific racial and ethnic categories, the results are equally concerning: Black individuals represent 12.6% of the population but only 2.1% of practicing radiologists; Latinx individuals represent 16.3% of the population but only 3.8% of radiologists; and collectively, American Indian and Alaska Native, Native Hawaiian, and other Pacific Islanders represent 1.1% of the population but only 0.1% of radiologists. Chapman and colleagues [3] also described a worrisome stability in this trend; their analysis of subspecialty trainees and residents did not indicate a significant trend toward

resolution of the racial and ethnic disparities in the radiology workforce.

Importance of diversity in pediatrics and pediatric radiology

In 1936, Charles Drew, an African-American surgical resident, was barred by the chair of his department from attending the same dining hall as his fellow surgical residents. He went on to develop the technology for blood transfusions [9]. Since then, there has been a transformation in American medicine from one in which African Americans and other URMs had very limited opportunities as physicians, to one in which they play a substantial role but are still underrepresented. It is now widely accepted that a health care workforce that mirrors the demographic characteristics of the population that it cares for presents the greatest chances for effective, humane and equitable care. Given the growing heterogeneity of our patient population with regard to socioeconomic status, race, ethnicity, language and religious beliefs, developing an equally diverse workforce has become a priority.

The imperative to develop a diverse workforce in pediatrics and pediatric subspecialties is particularly high. According to data and projections from the United States Census Bureau, the percentage of children who are racial and ethnic minorities is increasing. This trend is largely a result of a continuous rise in the percentage of Hispanics. In cities such as Miami, San Antonio and San Jose, Hispanics are a majority [10, 11], and it is estimated that by 2050 Garcia will replace Smith as the most common last name. Hispanic children are estimated to represent almost 25% of pediatric patients [12]. The percentage of Black children appears to have remained stable over the last decade, at approximately 14% [12]. A series of studies by Samuels-Kalow and colleagues [13, 14] highlighted the unique vulnerability of URM children, particularly when there is an added language barrier. In a 2013 study, the group reported that Hispanic children whose parents spoke primarily Spanish were 3.7 times more likely to experience dosing errors after being discharged from the emergency department [13]; in 2017, the same group also reported that Hispanic children were 3.5 times more likely to return to the emergency room within 72 h of discharge [14]. More recently, a study by Khan et al. [15] showed that patient comfort with English was associated with the risk of adverse events in hospitalized pediatric patients. The evidence extends beyond language barriers. A study by Greenwood et al. [16] highlighted the benefit of racial concordance in survival of African-American newborns in Florida; this study reported that the known perinatal mortality difference that exists between Black and White newborns (the risk is approximately 3 times higher for Black

newborns) was reduced by 50% when the treating physician was also Black [16].

Underrepresented minorities' representation in pediatric radiology is perhaps more important than in most other areas of radiology. Together with interventional radiologists and breast imagers, pediatric radiologists are among the subspecialties with the highest patient interaction [17]. The arguments described here with regard to the advantages of having a diverse physician workforce directly apply to the pediatric radiologist as a patient-facing subspecialist. Another advantage of increasing URMs in pediatric radiology is the synergistic relationship with URMs in other fields. The collaborative role of the pediatric radiologist in the care of children brings about frequent interactions with other services and professionals (pediatricians, surgeons, anesthesiologists, technologists, nurses, etc.); higher URM representation is likely to increase a sense of community with those in related fields.

Challenges to increasing underrepresented minorities in pediatric radiology: an insufficient pipeline

The biggest challenge to diversifying the workforce in radiology is an insufficient pipeline. The report from the AAMC on the total number of matriculants to United States medical schools in 2020–2021 shows statistics that are nearly identical to the 2013 analysis performed by Chapman and colleagues [3]. The AAMC data showed that from a total of 2,197 matriculants, only 15% were of URM background; Black, Hispanic, American Indian/Alaska Native/Native Hawaiian/Pacific Islander matriculants accounted for 8%, 6.9% and 0.2%, respectively [18]. The radiology-specific data on applicants to United States residency programs show an even smaller percentage of URMs. Respectively, the percentages of Black, Hispanic and American Indian/Alaska Native/Native Hawaiian/Pacific Islanders applicants for diagnostic radiology are 6.2%, 5.7% and 0.07%, and for the integrated interventional radiology residency the percentages are 7.3%, 6.2% and 0.2% [4]. Figure 1 summarizes the relative number of URMs in the United States population, in medical schools and in diagnostic radiology [4, 19]. Data on the race, gender and ethnicity of fellowship applicants and graduates of pediatric radiology training programs in the United States are non-existent; however, the low number of applicants from URM backgrounds in the overall pool of residents limits the ability of our field to recruit trainees from minority backgrounds, despite our best efforts. Considering that training a pediatric radiologist requires at a minimum 14 years after graduation from high school, these statistics and the lack of improvement in the last decade are alarming. It

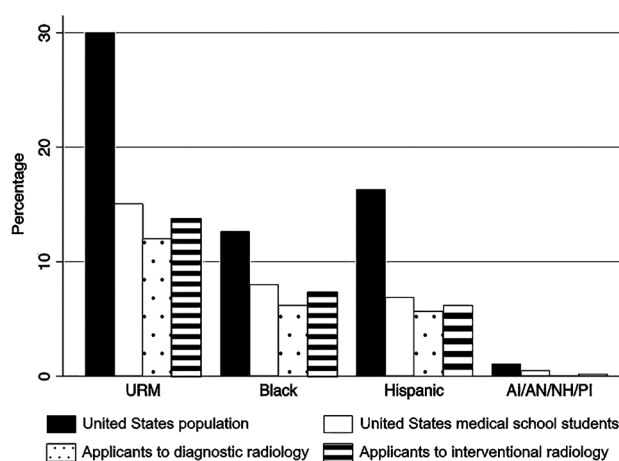


Fig. 1 Percentage of underrepresented minorities (URMs) — Black, Hispanic, American Indian and Alaska Native, and Native Hawaiian or other Pacific Islander — among the general population, the matriculants to medical school and the applicants to diagnostic radiology and integrated interventional radiology/diagnostic radiology programs. Data for the general population were obtained from the 2010 United States Census [19]. Other data were obtained from a 2020–2021 Association of American Medical Colleges (AAMC) report [4]. *AI* American Indian, *AN* Alaska Native, *NH* Native Hawaiian, *PI* Pacific Islander

is expected to take decades to correct the disparity between URMs in the radiology pool and in the general population.

A greater representation of URMs can only be achieved through persistent nurturing of future radiologists and in turn pediatric radiologists along every step in the professional life cycle of a physician, from high school through fellowship completion. URM participation in the science, technology, engineering and mathematics (STEM) fields is limited, and this in turn limits enthusiasm for technology-based professions or specialties such as radiology [20]. Fostering interest and supporting the decision to pursue careers in STEM as early as high school is a necessary step [21]. Volunteering to visit high schools and introducing the students to medicine as a career is a way to accomplish this. Not uncommonly, students from URM backgrounds have not met a physician of their own race and ethnicity and have not considered the possibility of pursuing a career in health care. The visiting physician can serve as a role model and empower students to seek opportunities in STEM fields. These efforts in turn need to be met by changes in the evaluation of applicants and admission to colleges and medical schools [22, 23]. A frontline role for the practicing pediatric radiologist emerges in medical school. Pediatric radiologists can get involved in medical education, either in basic science courses (e.g., anatomy, physiology, neuroscience) or in radiology-specific clerkships [24]; early exposure to the field has a positive impact in the number and profile of the prospective applicants to residency. A study by Spottswood

et al. [25] reported a 20% increase in recruitment of URM residents after designing novel forms for applicant evaluation and increasing the diversity of the selection committee. Early exposure to pediatric radiology rotations during residency is crucial for our subspecialty. Nurturing early interest, mentoring residents who are curious about the field, and highlighting the many advantages of the field are concrete interventions that improve recruitment. The recent publication by Strouse and colleagues [17] featuring interviews with eight pediatric radiologists who outlined the rewarding aspects of their careers is another example of how a practicing pediatric radiologist can contribute to recruiting the next generations of physicians. Additional efforts to capture the interest of junior residents and to mentor those individuals who manifest interest should be undertaken; these could include signaling opportunities for local community outreach and global health work, research grants for trainees, scientific and educational meetings, and opportunities to participate in committees as a trainee. The contributions at every single level are additive, but it is important to recognize that effective work to tip the needle requires sustained efforts over many years.

Recruitment of pediatric radiology staff

The last step that a URM pediatric radiology fellow faces prior to becoming staff is recruitment. Specific characteristics in the process can serve as facilitators or obstacles to the creation of a diverse workforce. Hiring through the eye of diversity requires a review of every step in the process to identify systemic bias and other barriers to hiring URM individuals. A consistent and intentional effort to address recruitment barriers is necessary to transform the recruitment process into a principle-driven task that aims to increase the diversity of our talent pool. Even though this is resource-intensive, the investment is well worth it. Efforts toward increasing URM representation frequently result in a more transparent, welcoming and effective recruitment process, with higher probabilities of hiring other minorities in the field such as women, gender-diverse minorities, and individuals with disabilities [1].

Recruitment starts with advertisement of a position [1]. Advertisement should be far-reaching, welcoming and explicit about the commitment to diversity. The concrete goal is to attract as many applicants as possible. Lack of advertisement of available positions or offering these first to a certain pool of applicants (e.g., only the trainees of the institution or those from medical centers in the region) severely limits the reach of the search. Available positions should be advertised broadly on social media (departmental and personal), the website of the department, through subspecialty journals and scientific societies and, if possible,

through societies and organizations that promote diversity (e.g., the American Association for Women in Radiology, National Hispanic Medical Association, institution-based diversity offices). The content of the advertisement should be carefully reviewed with attention to language that could dissuade individuals from applying. In pediatric radiology, recruitment is often done through informal networks. It is important that these informal conversations also stress the need for diversity in recruitment.

The composition of the selection panel is very important. It is crucial for departments of radiology to have diversity committees that are actively involved with recruitment of faculty and trainees and participate in selection committees. A selection committee that is diverse is better able to evaluate the applicants and less likely to be affected by individual or shared bias [1]. For positions that require an interview, the presence of URM interviewers can encourage a URM applicant to decide to take a job; conversely, the lack of URM representation on the selection panel might deter interviewees from doing so [26]. Because of the small size of some pediatric radiology departments and the low number of URM in the field, creating a diverse selection panel can pose a challenge; in these cases, inviting URM faculty from other departments might provide a suitable solution (for example, a URM pediatric surgeon serving on the selection committee for a staff pediatric radiology position). Some institutions require the staff involved in selection of candidates to complete training in unconscious bias prior to engaging in selection activities [27]. A review of the list of finalists, when appropriate, could provide an additional layer to the selection process; in cases of an insufficient (or below expected) number of URM applicants, efforts directed at increasing the pool can be taken by the selection committee [1].

Mentorship of underrepresented minorities

The importance of mentorship

A mentor is an individual who is personally and professionally invested in the academic advancement and overall well-being of a mentee, who is frequently a younger or less experienced person [28]. The term comes from Mentor, a friend of Ulysses whom he entrusted to teach and guide his son Telemachus while Ulysses was in the Trojan war. In the end, Ulysses (a.k.a. Odysseus) did not return for a decade, during which Mentor had devoted his life to the tutoring of Telemachus. Mentors and mentees often have some of the most solid and enduring relationships. Even though the mentoring relationship can take several forms, common elements include serving as a role model, listening and providing advice, support and feedback. Mentorship has long been

recognized as a cornerstone to the development of a successful and fulfilling medical career [6]. Faculty members with adequate mentorship are more academically productive, have better track records of funding, are promoted faster and report greater career satisfaction [28–31].

The importance of mentorship in academic medicine has never been greater. Junior pediatric radiologists are required to balance the demands of clinical service, teaching of trainees, and research. Frequently, the clinical responsibilities absorb the majority of junior radiologists' time, leaving them with little time for other scholarly pursuits [6, 32]. In an era of increasing clinical workload, decreasing revenue, and pressure to reduce report turnaround time, junior radiologists benefit enormously from the advice of senior physicians [6, 33, 34]. To further complicate matters, the early career years often coincide with a time of growing family responsibilities related to childcare or the need to care for elderly parents. The coronavirus 2019 (COVID-19) pandemic, which has disproportionately affected URMs, adds another source of stress to trainees and young faculty who have had to deal with death and illness in their families, and challenges imposed by balancing work and childcare or education.

Additional barriers that occasionally affect URM staff include bias, language and cultural differences, and lack of confidence [35]. Mentorship can help overcome many of these barriers to success and, in doing so, prevent attrition of academic careers [35–37]. Considering the low number of URM faculty at academic pediatric radiology departments, retention plays a critical role in maintaining the pool of URM staff [37].

Establishing a mentorship relationship

The mentor

Productive mentoring relationships require mutual interest, concerted effort and good interpersonal chemistry [38]. Starting a new mentoring relationship can be challenging, particularly for URM faculty, who are less likely to have been exposed to adequate mentoring. Having the mentee choose someone whom he or she looks up to, both professionally and personally, is a good first step. Generally speaking, a mentor with a robust clinical and research career is likely to be equipped with the experience to advise a broad set of mentees. The seniority of the mentor is important because common tasks undertaken by mentors include promoting the mentee's career, helping with networking, and easing navigation of institutional politics. A record of success in mentoring should also be considered. Individuals who are generous and empathetic with trainees, former mentees, and colleagues can be expected to perform similarly in new mentoring relationships. Being well-connected is important because a successful mentor can help foster

career opportunities in a wide geographic area. For smaller institutions with a relatively low number of senior and experienced mentors, programs to develop these skills are a good resource. A recently implemented mentoring program at Massachusetts General Hospital incorporated training sessions for the mentors and mentees in an attempt to maximize the benefits of the relationship [31]; the program successfully increased the rate of promotion of instructors to assistant professors, with a particularly positive impact on URM faculty [31].

Even though there can be advantages to racial and ethnic concordance, the driving factor of the success rests on the authentic commitment of the mentor to foster diversity. A mentor who is empathetic and sensitive to the challenges faced by URMs can serve well regardless of his or her racial and ethnic background. Furthermore, given the low number of URM pediatric radiologists, finding a racial or ethnically concordant member might not be possible in every instance and this should not deprive junior faculty from the benefits of mentoring. Mentors can also be located at an institution different from that of the mentee. A recent report by Gupta and colleagues [39] described the successful deployment of a large-scale (national) online mentorship program for radiology mentees across a variety of training levels, from medical students to junior faculty. This report is a timely contribution because it highlights the feasibility of increasing access to mentorship opportunities during a time when networking at national meetings has been difficult because of the COVID-19 pandemic.

The goals: creating a virtuous cycle of mentoring for success

A concrete and goal-oriented approach yields the best results. Early on, faculty require guidance about direction of their career. It is important for the mentee and the mentor to establish short- and medium-term goals and to review the progress toward these goals at the end of every year. Having formal meetings at regular intervals, at least every 2 months, contributes to ensuring that both the mentee and the mentor remain committed to the process. Together they should devise a plan of activities on which to focus as well as activities to avoid or postpone. Enthusiastic junior faculty might show genuine interest in multiple activities, failing to recognize the realistic limitations of their time. Overcommitment and lack of a well-defined research focus are common pitfalls for junior staff, which can be circumvented with the help of mentorship. As the academic career of the mentee takes off, specific advice about presentations at national meetings (e.g., reviewing slides, rehearsing presentations) and academic writing (reviewing manuscripts and grants) can be helpful. Advice regarding academic promotion is invaluable to junior faculty members, who might not be

familiar with the institution-specific criteria and requirements. Mentors can also serve as academic sponsors. As the curriculum vitae (CV) and skills of the mentee grow, mentors can help the mentee to establish a national and international reputation, suggest their name for invited lectures or committee work, and recommend them for promotions. The role of academic sponsorship, whether in association with the traditional mentoring relationship or performed by other senior faculty advisers, is increasingly recognized as a factor that drives success in academic pediatrics, particularly for URM [40]. Finally, a good mentor should help with existential issues such as the balance between life and work, dealing with stress and avoiding burnout.

The national advisory committee from the Research in Academic Pediatrics Initiative on Diversity (RAPID) outlined several factors that are critical to the success of young URM investigators in pediatrics, in addition to the others discussed here [41]. A salient finding was the benefit of having several mentors to advise in various aspects of the mentee's career or who bring different skills to the table; this is analogous to the concept of a "mentorship board" introduced by Bredella and colleagues [6]. Awareness and utilization of non-traditional sources of funding was also identified as a helpful factor. Many small foundation grants or institutional faculty development programs designed for URM can help jumpstart an academic career. Negotiation with departmental leadership for adequate resources, specifically time, also plays a crucial role [41]. Another important aspect is prioritization of commitments, particularly those related to diversity and inclusion. URM faculty are frequently expected to partake in committees tasked with improving diversity, which can be a double-edge sword. While important to the cause of diversity, these committee appointments might not be accompanied by allocation of administrative time to fulfill them and indent on the already limited academic time of a young URM radiologist [40, 41]. In time, however, it is hoped that the URM radiologists do become successful mentors, thus creating a virtuous cycle of minority mentorship. For now, it is incumbent that URM pediatric radiologists who are at senior or mid-career levels get involved in mentoring, given that mentoring by somebody who shares a similar background and challenges as the mentee is often the most effective.

Finally, recognizing the presence of unconscious and systemic bias and working to address these is paramount for URM faculty [26]. These are widespread and come from colleagues, supervisors and the particularly challenging scenario of patients (or their parents). Situational awareness of the institutional policy on these matters, resources available to the mentee (e.g., the institutional diversity and inclusion office, peer support groups), and coaching of the mentee to handle these challenging situations all constitute valuable spaces for mentoring.

Conclusion

Racial and ethnic minorities remain underrepresented in radiology. Increasing awareness of the role of a diverse workforce as a tool for excellence in medicine has invigorated efforts toward recruitment, retention and development of faculty from URM backgrounds. Mentorship plays a crucial role in these efforts by providing support and timely advice to junior URM faculty, directly contributing to their professional and personal growth, and cultivating the next generation of mentors.

Declarations

Conflicts of interest None

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