

# Improving Diversity, Inclusion, and Representation in Radiology and Radiation Oncology

## Part 2: Challenges and Recommendations

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The ACR Commission for Women and General Diversity is committed to identifying barriers to a diverse physician workforce in radiology and radiation oncology (RRO), and to offering policy recommendations to overcome these barriers. Part 2 of a 2-part position article from the commission addresses issues regarding diversity and inclusion in the context of career choices and professional advancement. Barriers to improving diversity and representation in RRO are reviewed. Discussion focuses on the development and implementation of concrete strategies designed to eliminate the current subspecialty disparity and highlights the need for the ACR to introduce programs and incentives with targeted and achievable goals with measurable outcomes. Recommendations are made aimed at fostering an environment of inclusion and diversity, so as to secure a successful future for all members of the RRO workforce. The future of radiology will be enhanced by increasing diversity and representation in the professional workforce, which will allow us to better address the varied needs of increasingly diverse patient populations, and to mitigate disparities in healthcare access, delivery, and outcomes. By leveraging diverse backgrounds, experiences, and skills of those in RRO, we will create new, effective ways to not only educate our trainees, medical colleagues, and patients but also improve delivery of health care and our service to society.

**Key Words:** Diversity, underrepresented minorities, health disparities, health policy, radiology, radiation oncology

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*Those who cannot remember the past are condemned to repeat it.*

—George Santayana

### INTRODUCTION

In this two-part position article from the ACR Commission for Women and General Diversity, we review the current status of diversity in radiology and radiation oncology (RRO) and highlight the challenges that minority groups face in their professional careers. Part 1 focused on the moral

imperative, public health, and business case to promote and leverage diversity [1]. Part 2 addresses career choices and professional advancement. Why are women and minorities underrepresented in RRO? What unique challenges do these historically disadvantaged groups face in contributing fully to our medical specialties? Our commission summarizes the challenges and opportunities for fuller participation particular to women and URM in radiology. Recommendations are provided, designed to foster an environment of

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diversity and inclusion, so as to secure a successful future for all members of the RRO workforce.

## ISSUES REGARDING DIVERSITY AND INCLUSION IN CAREER CHOICES AND PROFESSIONAL ADVANCEMENT

### Challenges Particular to Women in Radiology and Radiation Oncology

Unlike URM, women have entered and exited the medical school pipeline in increasing numbers and now comprise 50% of medical school classes (Figure 1). Previous studies and data from the Association of American Medical Colleges (AAMC) demonstrate that residency choices for both genders are the traditional high-patient contact fields of internal medicine, family practice, and for women, obstetrics and gynecology [2]. General surgery is an interesting anomaly, where female representation has steadily climbed during the past 5 years. These career choices are certainly reasonable and appropriate, as the medical system needs ever increasing numbers of physicians practicing in the outpatient arena.

More interesting are the reasons for disparate male and female representation in RRO residency programs. Baker et al found that the program director's gender did not affect female representation in diagnostic radiology residencies [3]. In 2 recent studies of medical students in radiology clerkships, no significant differences were identified between men and women in factors determining career choice, including competitiveness in

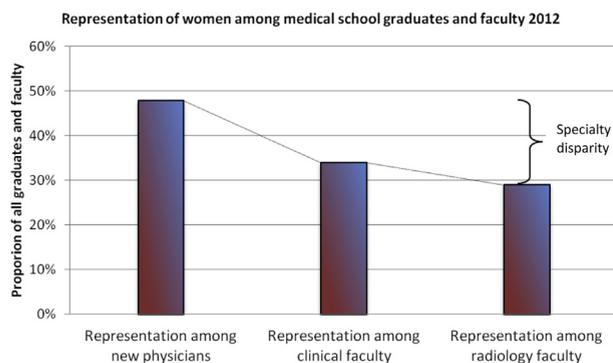
securing a residency position, role as a consultant physician, lack of mentors, and the technology-based nature of the specialty; flexible hours were not often cited as a motivator to consider diagnostic radiology [4,5]. The authors recommended early exposure using a required clerkship and increasing the availability of female mentors.

Medicine will undergo tumultuous changes during the next decade; predictions are for more radiologists and radiation oncologists as salaried employees, and decreased wages. This uncertainty, along with housing costs and accumulating debt, may lead students to consider shorter residencies. The median debt for graduating medical students is now \$175,000 [6]. Repayment may exceed \$400,000. For a 2-physician couple, the debt load may seem overwhelming.

Unique to women are pregnancy, postpartum recovery, and childcare challenges. The United States has no policy requiring adequate maternity and paternity leave or daycare facilities, and these rarely exist in medicine [7]. In most families, both parents work, yet women provide the greater share of childcare. Without a welcoming atmosphere allowing protected time off during the first year following childbirth, women finish training exhausted and seek careers with fewer demands on time. Once women complete RRO residencies, many enter academic practices. Female representation in academic medicine increased overall from 15% in 1970 to 35% [8], less than the expected 48%. Women and men are represented in equal numbers at the assistant professor level. Women do not rise through the ranks at the same pace as men, and many remain assistant professors for their entire careers. The percentage of female full professors in academic radiology departments is 18%, much less than the 26% in the fields of pediatrics and obstetrics and gynecology [8].

In a Masters of radiology panel discussion focusing on attracting female residents and promoting female leadership, several experts representing academic medical centers, private practice groups, and the military reported on their own experiences and those of their colleagues in promoting diversity [9]. Members of private practice groups focus on willingness to serve the group, including taking on positions beyond the standard workday such as clinical work on nights or weekends and service on hospital committees. Attendance at meetings held before or after standard working hours can be difficult for women responsible for childcare. Without additional participation in activities that benefit the group, women are considered to be second-class citizens. An exception is in the area of breast imaging, which is performed mostly by women [10,11] uniquely positioned in the field and closely allied with physician colleagues.

Women in the military and academia face the challenge of choosing a promotional track and adhering to its requirements. Mentors, male and female, are critical, especially during the early years of a career. Promotion



**Fig 1.** Women accounted for 48% of medical school graduates in 2012 [1], for 34% of all academic clinical faculty M.D.s, and for 29% of radiology faculty [2,3]. Women represent 51% of the U.S. population [4].

1. Association of American Medical Colleges. FACTS: applicants, matriculants, enrollment, graduates, MD/PhD, and residency applicants data. Available at: <http://www.aamc.com/data/facts/>. Accessed November 14, 2013.
2. Brotherton SE, Etzel SI. Graduate medical education, 2012-2013. *JAMA* 2013;310:2328-46.
3. Association of American Medical Colleges. U.S. Medical School Full-time Faculty Distribution by Rank and Gender, 2012 Washington, DC: Association of American Medical Colleges; 2013. Available at: [www.aamc.org/download/311372/data/2012\\_figure2.pdf](http://www.aamc.org/download/311372/data/2012_figure2.pdf). Accessed 11 November 2013.
4. US Census Bureau. Population estimates. Available at: <http://www.census.gov/popest/data/national/asrh/2012/index.html>. Accessed February 4, 2014.

requirements, especially in increasingly popular and available clinician educator and clinical service tracks are often officially unclear. Mentors advise junior faculty on the importance of key activities, such as publication of teaching tools and development of new clinical service lines. They introduce young women to hospital leaders and important committee positions. Communication with physician leaders from other disciplines often serving on promotions committees is extremely important. A well-executed promotion application increases the stature of the female participant and her mentor.

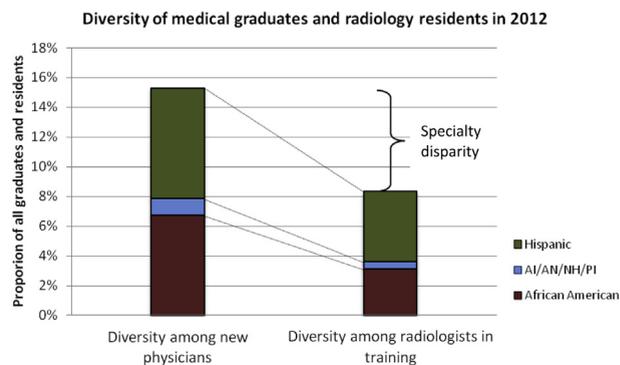
Colleagues of either gender within and beyond the department are also critical for clear instructions on the soft skills required for promotion. Even in the most enlightened groups, discrimination by omission remains a problem. Women need to learn when and how to ask for positions of authority. Introverts may have an especially difficult time with negotiation, and the use of an executive coach may be helpful. Absence of national service remains a barrier to achievement in the academic realm. Although some recent efforts to include women in national and international societies have been successful, less than 20% of premier journal editorial board members are women [12]. This fact is discouraging, as many women senior reviewers are successful in obtaining promotions and serve as mentors to junior members of the faculty.

Advancement in the realms of academia and private practice requires hard work and sacrifice for both genders. Women in academia should understand that a career as an associate professor is a fine choice. Promotion to the highest realms of power requires change in work-life balance that some women may not be willing to make.

### Challenges Particular to Underrepresented Minorities in Career Choice and Professional Advancement in Radiology and Radiation Oncology

Limited entry into the pipeline of URM undergraduate and medical students results in reduced downstream representation as residents, fellows, faculty, and practicing physicians. Even so, the lack of URM representation is even more pronounced in RRO relative to other medical specialties, as noted in Part 1. Thus, efforts to increase the numbers of URM medical students will not alone necessarily, automatically translate into increased representation within RRO (Figure 2). The reasons for the disparity between RRO and other specialties are unclear. Possible factors leading to an unaccessed but available stream of URM medical students have been organized into four overlapping themes: *exposure*, *interest*, *preparation/mentorship*, and *unconscious bias* [13,14].

Regarding initial *exposure*, blacks and Hispanics are less likely to attend medical schools with affiliated radiation oncology residency programs [14]. Additionally, RRO are generally offered as elective rotations, late in



**Fig 2.** Underrepresented minorities accounted for 15.3% of medical graduates in 2012 [1], and 8.3% of diagnostic radiology residents [2]. URMs accounted for 31.5% of the U.S. population [3]. AI = American Indian; AN = Alaskan Native; NH = Native Hawaiian; PI = Pacific Islander.

1. Association of American Medical Colleges. FACTS: applicants, matriculants, enrollment, graduates, MD/PhD, and residency applicants data. Available at: <http://www.aamc.com/data/facts/>. Accessed November 14, 2013.
2. Brotherton SE, Etzel SI. Graduate medical education, 2012-2013. JAMA 2013;310:2328-46.
3. US Census Bureau. Population estimates. Available at: <http://www.census.gov/popest/data/national/asrh/2012/index.html>. Accessed February 4, 2014.

the medical school curriculum. Efforts to provide early and focused exposure awareness of these fields have demonstrated variable though generally favorable efficacy [15,16]. Studying the effects of such exposure may yield insight into factors related to URM interest (or disinterest); once exposed, is there inherently less URM *interest* in the RRO field? The more technical aspects of the radiological sciences may present steep challenges, in view of known deficits in URM participation in the STEM (science, technology, engineering, and math) fields [17]. A perception that there is less patient contact in RRO may also lead to decreased URM medical student interest. Among reasons reported by URMs for selecting medicine as a career, blacks and Hispanics gave highest ratings to the following: patient contact, exercise of social responsibility, educating patients about health, and the opportunity to make a difference [18]. Emphasizing opportunities for patient contact and education may be used to attract both URMs to RRO.

For those candidates who do have an interest in RRO, are they adequately *prepared* and appropriately *mentored*? According to the 2010 program directors survey, the top two factors in ranking radiation oncology residency applicants were letters of recommendation and research, which are arguably related to exposure and mentorship. These factors were rated more highly than clerkship grades and the US Medical Licensing Examination Step 1 score [19]. Ensuring adequate research experience might begin to address this issue. However, there are no targeted mentorship programs for medical students or residents in radiology, and only a limited program in radiation oncology [20]. When women and URM

applicants do apply in RRO, they generally submit *fewer applications* than their male and non-URM counterparts, likely limiting their chance of matching [13,14]. Barriers to submitting more applications, such as cost, geography, and practice setting should be explored. Assessment of these sensitive and important issues requires adequate and deliberate mentorship and is likely hindered by a dearth of diverse, senior URM academic faculty and practicing physicians. Factors hindering URM representation among academic faculty, such as lower perceptions of network inclusion and experiences of racial or ethnic discrimination [21], must therefore similarly be addressed.

Finally, a recent study found that female laboratory manager position candidates were rated as less competent and less hireable than men with equal qualifications, and they were offered less career mentoring [22]. Similar results have been found for racial and ethnic minorities [23-25]. If equally qualified URMs are perceived to have less aptitude and so are selected less frequently for training positions, then such perceptions may ultimately limit educational and career opportunities. Future research should evaluate the ways in which both women and URMs are provided with opportunities and mentored throughout medical school and residency, particularly in less diverse fields such as RRO, to determine whether *unconscious bias* has an effect on specialty choice, residency selection and acceptance, and career advancement and progression.

### **Challenges Particular to Lesbian, Gay, Bisexual, and Transsexual Students and Physicians in Career Choice and Professional Advancement in Radiology and Radiation Oncology**

Literature regarding lesbian, gay, bisexual, and transsexual (LGBT) issues in medicine generally concerns health disparities, such as the Institute of Medicine report assessing the state of science on the health status of LGBT populations [26]; efforts to integrate LGBT health in the medical student education curriculum, such as those by the AAMC [27]; and health policy and advocacy, such as that of the AMA Gay, Lesbian, Bisexual, and Transgender Advisory Committee [28]. A few LGBT radiologists have received visibility through the media: Dr. Alan Hart pioneered the use of x-ray photography in tuberculosis and was one of the first female-to-male transsexuals [29]; Dr. Danielle Kaufman, a board-certified radiologist and chief of nuclear medicine, wrote a book about her transition, *Untying the Knot: A Husband and Wife's Story of Coming Out Together* [30].

It is unknown if LGBT physicians are underrepresented in RRO or in particular practice settings (eg, rural versus urban, academic versus private practice) and therefore face unique barriers to entry and advancement. Limited literature emanating after the American Psychiatric Association's 1973 landmark decision to remove

homosexuality from the nomenclature of psychiatric disorders proposed that LGBT individuals might face personal questions when deciding to come out, as to whether it would influence their medical school grades, competitive residency selection, classmate support, ostracism, specialist referrals, and ability to practice in a small town [31]. Surveys confirmed these concerns [32,33]. LGBT physicians reported being refused privileges or denied promotion or employment based on their sexuality; being denied referrals; experiencing verbal harassment from their professional colleagues; being socially ostracized; overhearing colleagues disparage LGBT patients; witnessing substandard care or denial of care to LGBT patients; or being victims of overt gay bashing [34].

Although cultural climate and workplace hostility seem to have improved, and more recent survey data suggest a growing acceptance of LGBTs as physicians, issues nonetheless persist. In a 2005 survey, 95% of LGBT students applying for medical school did not disclose their sexuality for fear of discrimination, and 46% did not disclose when applying for a residency [35]. A 2010 AMA and Gay and Lesbian Medical Association survey of 427 LGBT physicians found continuing workplace harassment and discrimination [36]. They specifically reported being denied referrals (10%); harassment (15%); social ostracism (22%); overhearing derogatory comments about LGBT individuals (65%); witnessing discriminatory care of an LGBT patient (34%); disrespect toward an LGBT patient's partner (36%); and discriminatory treatment of an LGBT coworker (27%). Few had received any formal education on LGBT issues in medical school or residency [36]. It is likely that such manifestations of conscious (overt homophobia or heterosexism) or unconscious bias also permeate the RRO field. Further study is needed to understand how this bias may affect entrance into the field, specialization, career advancement, promotion, practice setting, and patient care. In the meantime, numerous resources are available to foster and promote a culture of inclusion [37-39].

### **STRATEGIES TO OVERCOME CURRENT BARRIERS**

Women and underrepresented minorities face barriers and challenges limiting their full contribution to RRO. What strategies can the ACR undertake to make our specialties more diverse and representative? The ACR must take the lead in reducing the gap between the representation of women and URMs in RRO compared to other medical specialties. Addressing this "subspecialty disparity" will be a tangible demonstration of the organization's commitment to diversity as part of its core values and mission. The design and implementation of strategies to eliminate this disparity should be a central focus of ACR leadership as a targeted, achievable goal. Setting this agenda does not require solving the

**Table 1.** Values, manifestations, and organizational imperatives in Diversity 3.0: making diversity central to the mission

Values and imperatives in Diversity 3.0		
Equity	Diversity	Inclusion
Commitment	Visibility	Support
Hire differently	Manage differently	Promote differently

overarching problem of the limited stream of URM undergraduate students entering medicine. However, it *does* require that the organization address its own deficiency in the RRO pipeline. In doing so, the organization affirms its serious commitment to inclusion and diversity as prime objectives.

The ACR should model other medical specialties that have achieved a higher proportion of women and URMs in not only their fields, but among their leadership. The ACR should develop strategies to address the impediments specific to their exposure, recruitment, retention, and advancement of women and URMs, and set benchmarks and metrics to measure the success of its efforts. Each area should be examined in order to direct strategies toward the eradication of such impediments. For example, blacks and Hispanics have a greater likelihood of attending medical schools affiliated with historically black colleges and universities (HBCUs) which, though quite diverse in student composition, still educate a higher proportion of URM students than do majority medical schools. Typically, because these HBCUs lack RRO training programs [14], students are less likely to be exposed to RRO in clinical rotations or electives, or to radiologists or radiation oncologists as faculty and mentors. The ACR should explore ways it can promote accredited residency programs at these institutions, working collaboratively with organizations such as the ACGME and AAMC. Initiatives providing financial and mentoring assistance to increase the number of applications from women and URM students to residency programs could be easily implemented, and outcomes readily measured.

The ACR should develop mentoring initiatives for women and URM students, residents and fellows-in-training, academic faculty, and practicing physicians. As there is an absence of mentorship programs in diagnostic radiology, the ACR should be charged to fill this void. The diagnostic radiology community can take the lead from radiation oncology colleagues, who are far ahead in mentoring initiatives such as the ASTRO scholarship and awards programs [20]. The ACR could promote increased involvement in clinical radiology and in research via similar programs or externships. ACR's Radiology Leadership Institute could conduct executive coaching courses and training experiences for women and URM physicians to build skills to advance careers and facilitate leadership diversity. The ACR should incorporate these initiatives into programmatic objectives for the recently launched "Leading Radiology into the Future."

**Table 2.** Recommendations to the ACR: improving diversity, representation, and inclusion in radiology and radiation oncology for women and underrepresented minorities in medicine

#### Advocacy and awareness

- Raise awareness about the status of women and URMs through resources such as review and position papers, web-based resources, and sustained membership communication and dialogue.
- Develop national standards for valuing professional stewardship activities that women and URMs are likely to perform so that the full range and quantity of their service activities are factored into decisions about promotion and leadership (eg, women are more likely to volunteer to teach, URMs are more likely to serve in underrepresented communities).
- Develop metrics for monitoring and publicizing individual institutional and practice progress on professional diversity.
- Develop benchmarks for assessing institutional and practice performance on diversity and inclusion.
- Implement a reward system to highlight the accomplishments of radiation and radiation oncology practices that successfully achieve Diversity 3.0 and disseminate successes as models for diversification.

#### Professional opportunities

- Increase the visibility of accomplishments by women and URMs to ensure that their professional contributions receive recognition and open opportunities for advancement.
- Offer leadership positions to accomplished and able women and URMs.
- Create programs that directly engage and support women and URMs so that they can develop professionally.
- Develop incentive programs to attract minorities into radiation and radiation oncology as a medical career.
- Improve recruitment and retention of women and URMs.
- Expand initiatives to include diverse, excluded groups such as those who are lesbian, gay, bisexual, or transsexual; veterans; those who are disabled; and the socioeconomically disadvantaged.

#### Institutional performance and practices

- Develop leaders that value diversity; mandate cultural competence and a commitment to diversity.
- Require diverse search committees for new hires.
- Hold leadership accountable for the implementation of diversity and inclusion practices.
- Develop and maintain a system of accountability and responsibility that involves all departmental or practice members to ensure diversity and inclusion.
- Improve the work climate for women and URMs by implementing initiatives such as flexible work schedules, strengthening policies that support career-life balance, and embracing diversity among team members.
- Encourage institutions and practices to implement mentorship programs that specifically address barriers and inequities affecting women and URMs.
- Implement regular and transparent salary reviews; verify equal pay for equal work.
- Require that a 5-year review of the department or practice includes assessment of diversity and inclusion.

The ACR should explore active outreach to these populations of URM medical students to expose them to the specialties of RRO. Top motivators that attract these students to enter medicine include patient contact, social responsibility, patient education, and making a difference [18]. The ACR should educate URM medical students

regarding ways in which the RRO field meets their needs in these arenas, emphasizing the central roles our specialties play in delivery of patient-centered care, and opportunities for patient contact, especially in breast and women's imaging, interventional radiology, and radiation oncology. Our profession makes a difference by ensuring that patients receive high-quality appropriate care, and by protecting the public through radiation safety initiatives. This outreach can occur in collaboration with medical schools, the AAMC, and with established organized student medical associations, such as the Student National Medical Association or the Latino Medical Student Association. Ongoing study is warranted regarding the effect of unconscious bias on the perception of candidate abilities and aptitudes in the STEM fields, self-selection for STEM and RRO, recruitment into RRO residency programs, and impact on career outcomes.

## RECOMMENDATIONS FOR THE HOUSE OF RADIOLOGY

Many past initiatives intended to improve diversity, inclusion, and representation in medicine have achieved limited and variable success [40]. Although minorities and women remain underrepresented as physicians and in leadership and faculty positions, recent gains are marginally encouraging [41]. Leaders in the House of Radiology now have an opportunity to learn from history, and to "get our house in order" by formulating effective and creative programs. Our recommendations are informed by past and future studies of diversity; the values, manifestations, and organizational imperatives of successful diversity initiatives appear in Table 1. Our vision for ACR is to achieve performance at the level of Diversity 3.0.

Our recommendations, detailed in Table 2, include initiatives in three major areas: advocacy and awareness; professional development support; and institutional performance improvement. By addressing the challenges to inclusion, representation, and diversity for women and URM in RRO, the ACR can help to reduce the disparity that exists within our specialty and to achieve workforce diversity in order to meet the future needs of all of our stakeholders, patients, and physicians alike.

## CONCLUSION

The future of radiology will be enhanced by increasing diversity and representation in the professional workforce, which will allow us to address varied needs of diverse patient populations, and to mitigate disparities in healthcare access, delivery, and outcomes. By leveraging diverse backgrounds, experiences, and skills of radiologists and radiation oncologists, we will create new, effective ways to not only educate our trainees, medical colleagues, and patients but also improve delivery of health care and our service to society.

## TAKE-HOME POINTS

- Responsibility for the success of each organization's diversity and inclusion efforts lies with top and senior management.
- Medical organizations such as the ACR must lead by placing diversity, representation, and inclusion into the central missions and core policies of our organizations.
- To date, progress has been made in gender representation and diversity, although career choice and advancement for women remain compromised.
- URMs are disproportionately underrepresented in RRO as compared with other medical specialties: the "specialty gap."
- There is a unique opportunity and achievable goal for RRO to eliminate this specialty disparity and to improve diversity even with the current supply of candidate trainees.
- Further efforts at making environments more inclusive, and to study the impediments to expanding the diversity of radiologists and radiation oncologists, are recommended.

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## REFERENCES

1. Lightfoote JB, Fielding JR, Deville C. Improving diversity, inclusion, and representation in radiology and radiation oncology: Part One: Why these matter. *J Am Coll Radiol* 2014;11:673-80.
2. Association of American Medical Colleges. Diversity in medical education: facts & figures 2010. Washington, DC: AAMC; 2010.
3. Baker SR, Barry M, Chaudhry H, Hubbi B. Women as radiologists: are there barriers to entry and advancement? *J Am Coll Radiol* 2006;3: 131-4.
4. Fielding JR, Major NM, Mullan BF, et al. Choosing a specialty in medicine: female medical students and radiology. *AJR Am J Roentgenol* 2007;188:897-900.
5. Potterton VK, Ruan S, Sunshine JH, Applegate K, Cypel Y, Forman HP. Why don't female medical students choose diagnostic radiology? A review of the current literature. *J Am Coll Radiol* 2004;1:583-90.
6. Association of American Medical Colleges. Medical student education: debt, costs, and loan repayment fact card. Available at: <https://www.aamc.org/download/152968/data/debtfactcard.pdf>. Accessed November 11, 2013.
7. Heilbrun ME, Bender CE, Truong HB, Bluth EI. Health issues and the practicing radiologist: defining concepts and developing recommendations for leave options and policies. *J Am Coll Radiol* 2013;10: 695-701.
8. Association of American Medical Colleges. US medical school full-time faculty distribution by rank and gender, 2012. Available at: [https://www.aamc.org/download/311372/data/2012\\_figure2.pdf](https://www.aamc.org/download/311372/data/2012_figure2.pdf). Accessed November 11, 2013.
9. Forman HP, Larson DB, Kaye AD, et al. Masters of radiology panel discussion: women in radiology—how can we encourage more women

- to join the field and become leaders? *AJR Am J Roentgenol* 2012;198:145-9.
10. Roubidoux MA, Packer MM, Applegate KE, Aben G. Female medical students' interest in radiology careers. *J Am Coll Radiol* 2009;6:246-53.
  11. Poller WR. Re: "Why don't female medical students choose diagnostic radiology? A review of the current literature." *J Am Coll Radiol* 2005;2:386.
  12. Amrein K, Langmann A, Fahrleitner-Pammer A, Pieber TR, Zollner-Schwetz I. Women underrepresented on editorial boards of 60 major medical journals. *Gend Med* 2011;8:378-87.
  13. Chapman CH, Hwang WT, Both S, Thomas CR Jr, Deville C. Current status of diversity by race, Hispanic ethnicity, and sex in diagnostic radiology. *Radiology* 2014;270:232-40.
  14. Chapman CH, Hwang WT, Deville C. Diversity based on race, ethnicity, and sex, of the US radiation oncology physician workforce. *Int J Radiat Oncol Biol Phys* 2013;85:912-8.
  15. Dobre MC, Maley J. Medical student radiology externs: increasing exposure to radiology, improving education, and influencing career choices. *J Am Coll Radiol* 2012;9:506-9.
  16. Zaorsky NG, Malatesta TM, Showalter TN, et al. Impact of a radiation oncology elective on the careers of young physicians: update on a prospective cohort study. *Int J Radiat Oncol Biol Phys* 2013;86:214-5.
  17. Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline (US). Expanding underrepresented minority participation. Washington, DC: National Academies Press; 2011.
  18. Association of American Medical Colleges (AAMC). Minorities in medical education: facts & figures 2005. Washington, DC: AAMC; 2005.
  19. National Resident Matching Program. Results of the 2010 NRMP Program Director Survey. Available at: <http://b83c73bcf0e7ca356c80-e8560f466940e4ec38ed51af32994bc6.r6.cf1.rackcdn.com/wp-content/uploads/2013/08/programresultsbyspecialty2010v3.pdf>. Accessed November 26, 2013.
  20. American Society for Radiation Oncology. ASTRO Minority Summer Fellowship Grant. Available at: <https://www.astro.org/Research/Funding-Opportunities/ASTRO-Supported-Grants/Minority-Summer-Fellowship/Index.aspx>. Accessed January 20, 2014.
  21. Pololi LH, Evans AT, Gibbs BK, Krupat E, Brennan RT, Civian JT. The experience of minority faculty who are underrepresented in medicine, at 26 representative US medical schools. *Acad Med* 2013;88(9):1308-14.
  22. Moss-Racusin CA, Dovidio JF, Brescoll VL, Graham MJ, Handelsman J. Science faculty's subtle gender biases favor male students. *Proc Natl Acad Sci USA* 2012;109:16474-9.
  23. Ginther DK, Haak LL, Schaffer WT, Kington R. Are race, ethnicity, and medical school affiliation associated with NIH R01 type 1 award probability for physician investigators? *Acad Med* 2012;87:1516-24.
  24. Haider AH, Sexton J, Sriram N, et al. Association of unconscious race and social class bias with vignette-based clinical assessments by medical students. *JAMA* 2011;306:942-51.
  25. Milkman KL, Akinola M, Chugh D. Temporal distance and discrimination: an audit study in academia. *Psychol Sci* 2012;23:710-7.
  26. Institute of Medicine. The health of lesbian, gay, bisexual, and transgender people: building a foundation for better understanding. Washington, DC: National Academies Press; 2011.
  27. Association of American Medical Colleges. LGBT initiatives. Available at: <https://www.aamc.org/initiatives/diversity/portfolios/334326/lgbtinitiatives.html>. Accessed November 29, 2013.
  28. AMA. GLBT Advisory Committee, Chicago, IL. Available at: <http://www.ama-assn.org/ama/pub/about-ama/our-people/member-groups-sections/glb-adv-adv-committee.page>. Accessed November 29, 2013.
  29. Hansen B. Public careers and private sexuality: some gay and lesbian lives in the history of medicine and public health. *Am J Public Health* 2002;92:36-44.
  30. Kaufman DL. Untying the knot: a husband and wife's story of coming out together. Omaha, NE: Addicus Books; 2013.
  31. Burke BP, White JC. Wellbeing of gay, lesbian, and bisexual doctors. *BMJ* 2001;322:422-5.
  32. Brogan DJ, Frank E, Elon L, Sivanesan SP, O'Hanlan KA. Harassment of lesbians as medical students and physicians. *JAMA* 1999;282:1290-2.
  33. Matthews WC, Booth MW, Turner JD, Kessler L. Physicians' attitudes toward homosexuality—survey of a California county medical society. *West J Med* 1986;144:106-10.
  34. Schatz B, O'Hanlan KA. Anti-gay discrimination in medicine: results of a national survey of lesbian, gay and bisexual physicians. San Francisco, CA: Association GaLM; 1994.
  35. Merchant RC, Jongco AM 3rd, Woodward L. Disclosure of sexual orientation by medical students and residency applicants. *Acad Med* 2005;80:786.
  36. Eliason MJ, Dibble SL, Robertson PA. Lesbian, gay, bisexual, and transgender (LGBT) physicians' experiences in the workplace. *J Homosex* 2011;58:1355-71.
  37. AMA. Nondiscrimination statement 2013. Available at: <http://www.ama-assn.org/resources/doc/glb-adv-adv-committee.pdf>. Accessed November 29, 2013.
  38. American Medical Student Association. LGBT residency and medical school directory 2013. Available at: <http://www.amsa.org/gender/programreviews.cfm>. Accessed November 30, 2013.
  39. Gay and Lesbian Medical Association. Compendium of health profession association LGBT policy & position statements 2013. Available at: [http://www.glma.org/\\_data/n\\_0001/resources/live/GLMA%20Compendium%20of%20Health%20Profession%20Association%20LGBT%20Policy%20and%20Position%20Statements.pdf](http://www.glma.org/_data/n_0001/resources/live/GLMA%20Compendium%20of%20Health%20Profession%20Association%20LGBT%20Policy%20and%20Position%20Statements.pdf). Accessed November 30, 2013.
  40. Sullivan LW. Missing persons: minorities in the health professions, a report of the Sullivan Commission on Diversity in the Healthcare Workforce. Atlanta, 2004. Available at <http://www.aacn.nche.edu/media-relations/SullivanReport.pdf>.
  41. Association of American Medical Colleges (AAMC). Diversity in medical education: facts & figures 2012. Washington, DC: AAMC; 2012.



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