

## Scientific Article

# Workplace Gender Inequity Is Driven by Broader Societal Inequity: A Qualitative Study of Senior Japanese and American Radiation Oncologists

Christina Hunter Chapman, MD, MS,<sup>a,b</sup> Kyoko Nomura, MD, MPH, PhD,<sup>c</sup>  
Ayesha Kothari,<sup>d</sup> Namratha Atluri,<sup>d</sup> and Anneyuko I. Saito, MD, PhD<sup>e,\*</sup>

<sup>a</sup>Department of Radiation Oncology, University of Michigan, Ann Arbor, Michigan; <sup>b</sup>Center for Clinical Management Research, Veterans Affairs Ann Arbor Health Care System, Ann Arbor, Michigan; <sup>c</sup>Department of Public Health, Akita University Graduate School of Medicine, Akita City, Japan; <sup>d</sup>University of Michigan, Ann Arbor, Michigan; <sup>e</sup>Department of Radiation Oncology, Juntendo University, Faculty of Medicine, Bunkyo, Japan

Received April 16, 2021; accepted December 1, 2021

## Abstract

**Purpose:** Gender inequity in medicine harms society, and often originates in the context of broader societal discrimination. This study explores the experiences of older women in the radiation oncology specialty in Japan and the United States, with an emphasis on understanding how broader gender inequity affects career trajectory. Radiation oncology is an ideal setting to investigate cross-cultural physician gender equity issues, because few women enter the field despite fewer barriers (eg, frequent emergencies, evening/weekend hours, long procedures) that are commonly cited by women as deterrents in specialty selection.

**Methods and Materials:** Between 2012 and 2016, the authors interviewed 14 older women in radiation oncology (department chairs or full professors), with 6 from Japan and 8 from the United States. Multiple analysts identified themes to explore the impact of societal gender inequity on female radiation oncologists' careers.

**Results:** Five themes were identified: (1) childhood gender constructs affect career aspirations, (2) persistent sexism and gender-based workplace challenges affect women's careers, (3) gender inequity in the home affects women's careers, (4) non-gender-related factors intersect to affect women's career satisfaction, and (5) attaining gender equity appears to be even more challenging in Japan compared with the United States.

**Conclusions:** Female radiation oncologists in 2 of the most technologically advanced countries report that gender discrimination across their lifespans substantially affects career success. Because gender inequality reflects societal injustice and negatively affects scientific progress and patient outcomes, future research should focus on global approaches to address professional and domestic gender constructs that impede women's career progress.

© 2021 The Author(s). Published by Elsevier Inc. on behalf of American Society for Radiation Oncology. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Sources of support: This work was supported by the research fund program for Japanese Association of Women Radiation Oncologists in 2012.

Disclosures: none.

Research data are not available at this time.

\*Corresponding author: Anneyuko I. Saito, MD, PhD; E-mail: [anyusaika@yahoo.co.jp](mailto:anyusaika@yahoo.co.jp)

<https://doi.org/10.1016/j.adro.2021.100879>

2452-1094/© 2021 The Author(s). Published by Elsevier Inc. on behalf of American Society for Radiation Oncology. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

Gender inequity in medicine is a global concern, and manifests quantitatively as exclusion (whether de jure or de facto) of women in specialties and as leaders and qualitatively as gender-based inequity across career trajectory. Gender



inequity often signals broader societal inequity. Data from the United States have long shown that employers discriminate against women.<sup>1,2</sup> In Japan, gender discrimination was brought to the forefront after multiple medical schools admitted to falsifying test scores to exclude female applicants.<sup>3</sup> Gender discrimination is unethical and wasteful, because of its inefficient use of human capital by precluding society from fully benefitting from the most qualified medical leaders. This holds especially true given data demonstrating the benefits of diverse teams<sup>4,5</sup> and associations between improved patient care outcomes and female physician gender.<sup>6,7</sup>

Gender inequity is often exacerbated in fields, such as radiation oncology, that fail to achieve gender representation mirroring society.<sup>8-10</sup> Women comprise 26%<sup>9</sup> and 17%<sup>11</sup> of radiation oncologists in the United States and Japan, respectively, despite representing 34%<sup>12</sup> and 19%<sup>13</sup>, respectively, of the total physician workforce. Gender inequity may self-correct over time, but this suggested notion is refuted by the fact that only one-third of U.S. radiation oncology residents are women despite the fact that they represent half of the medical school population.<sup>9</sup> Additionally, although increasing the representation of women in medicine is necessary, representation alone is not sufficient to ensure full inclusion, because women remain frequently excluded from leadership positions.<sup>14</sup>

To better understand the experiences and challenges of female physicians in distinct cultures, we interviewed older women in radiation oncology in Japan and the United States. We specifically sought to examine how career experiences relate to broader societal gender constructs across career trajectories.

## Methods and Materials

### Study design and sample

We performed a qualitative, semistructured interview study involving interviews of older women in radiation oncology in the United States and Japan. We targeted older women to gain perspectives from all career stages. We used a purposive sampling strategy by identifying all female radiation oncology department chairs or full professors in Japan and the United States. We sent an email explaining the study and inviting women to participate. A total of 14 women agreed to participate, with 6 from Japan and 8 from the United States. We interviewed the women between October 2012 and May 2016. We obtained approval from the institutional review board from Juntendo University Urayasu Hospital.

### Data collection

We developed an interview guide to assess experiences across the women's lifespans. Interviews were performed

by 1 individual with expertise in the field of radiation oncology. Audio-recorded discussions were transcribed. Interviews performed in Japanese were translated into English for the analysis.

### Data analysis

The analysis was performed by 2 radiation oncologists, with 1 from Japan and 1 from the United States. Initially, 1 radiation oncologist read all transcripts, and identified the initial categories to help facilitate the analysis. Then, the second radiation oncologist read all transcripts, and coded quotes according to the themes defined by the first radiation oncologist or new themes identified. Subsequently, the first radiation oncologist reviewed the second radiation oncologist's codes, and selected representative quotations.

### Reflexivity

All authors identify as women, have previous knowledge of data on gender inequity in the United States and abroad, and believe there is more work to be done to address gender inequity (ie, none of the authors or reviewers believe that gender inequity is solely a phenomenon of the past). Among the author group, there was generally a more uniform understanding of U.S. than Japanese culture.

## Results

Fourteen female radiation oncologists were interviewed, with 6 from Japan and 8 from the United States. We identified 5 major themes: (1) childhood gender constructs affect career aspirations, (2) persistent sexism and gender-based workplace challenges affect women's careers, (3) gender inequity in the home affects women's careers, (4) non-gender-related factors intersect to affect women's career satisfaction, and (5) interviewees perceived even less gender equity in Japan than in the United States. Herein, we summarize the themes and subthemes.

### Childhood gender constructs affect career aspirations

Interviewees were rarely explicitly encouraged to be physicians, and many lacked physician role models.

My idea was to have a job . . . have some kind of employment but actually I thought I would become a physical therapist. . . . I went to college for physical therapy. . . . I switched to premed after a couple of years but I really didn't consider being a doctor. . . . I didn't have good examples of women who have done those types of things and my mom was a stay-at-home mom. . . . I didn't know any women who did

anything other than, you know, [teach] or those kind of things . . . so I really don't have examples but I knew I liked sciences, I enjoyed math [and] physical therapy and seemed to be a good fit. (United States)

Many Japanese participants related to this experience, although some described having exposure to medicine through parents who were physicians.

### **Pathways to academia and leadership were not necessarily deliberate or expected**

Participants who did consider becoming physicians earlier in their lives primarily thought of patient care and not research careers.

Yes, I think I am not positive that I thought I would be in the academics. . . . I think I realized that I might be but I didn't know much about academics. . . . [M]y only exposure to medicine prior to go[ing] to medical school was my family doctor who obviously wasn't in academics. . . . [H]e was just a local family doctor . . . so I didn't know much about it. (United States)

### **Persistent sexism and gender-based workplace challenges affect women's careers**

#### **Women report both inadequate gender diversity and inclusion throughout career pipeline**

Many interviewees report that their opinions were not valued.

When I entered the medical executive committees, I was the only female there. It was the same thing over again, no one wanted to hear anything I had to say. I was rarely allowed to express opinions. . . . (United States)

#### **Perceptions of meritocracy and equity vary among women and across contexts**

Some participants denied having personal experience with gender-based discrimination. When asked about whether they were inconvenienced by being one of few women in leadership roles, 1 respondent replied, "No, because I never felt discriminated [against]" (United States).

Other participants felt that gender equity varied across institutions, contexts, or roles. For example, some participants felt that salaries were equitable at their institution but not at others, or that some processes were more objective than others, such as academic promotion.

I'm a full professor and there's no problem in becoming a full professor as a woman. . . . [T]here [are] requirements, those are the same as for men and as for women. If you work hard and . . . if you want [to become a] professor, you can. . . . I don't feel there's glass ceiling in that regard. Where I worked, it is very fair. (United States)

Participants also described a double standard in which they were required to be evidence-based, but men could use power to exert influence regardless of the evidence.

They [men] try to use more power rather than working very hard and [being] scientific and, you know, women these days are evidence-based. So they try to put their focus, you know, to show the evidence. That's what the Japanese women . . . they have to do that. (Japan)

### **Women who intend to bear children reported frequent discrimination**

. . . [I]f I said I [am] get[ting] married or am going to have a baby, they said "Oh, that's too bad. You are over. You are going to spoil your career!" At that time, the women professors or the senior women physicians who were working there were all single women. (Japan)

### **Oncology may emotionally affect men and women differently**

Interviewees also expressed concerns that the emotional impact of oncology might differ between the genders, potentially affecting career choice and experiences.

. . . [Y]ou can't be expected to take on everything and solve their depression and their anxiety . . . because then you truly wouldn't be able to do radiation. So but I think if you have some help with those things that women are afraid of, that might encourage some to go to the field. (United States)

It's very rewarding but very emotional, I think. And maybe men can cut that off more easily? I don't know. There're some very nice and soft men, too. (United States)

### **Women often help other women, but sometimes practice self-group distancing**

Many participants expressed a desire to help and support other women: "All these people . . . like a generation below me, I helped all those people" (United States).

However, some participants noted that they received harsh criticism from other women: "They said 'You are not considering your work seriously.' These kind of words came also from male physicians, but mostly strong words came from female physicians." (Japan)

### **Gender inequity in the home affects women's careers**

Interviewees in both countries described gender norms that involve women performing a disproportionate share of the domestic labor and prioritizing their family members' needs above their own, which decrease opportunities for career advancement.

When I was young, I paid more money than I earned to the person who took care of our kids and did house-keeping, therefore, I asked our parents for economic help. I think being a woman has a negative effect in the economic situation. (Japan)

It is not easy for anybody, especially in Japan, during training to get married and have a baby because that society is not supportive. . . . So women . . . are responsible to take care of their children and support their husbands, and especially husbands, they would like to be promoted. The wives, they have to follow her husband's trail, promotion . . . to put their promotion afterwards, but by the time they come back to be promoted, it's too late, because they have to start way early to be promoted. The Japanese system is not up to it. And by the time you realize you're too old, your parents might need your help and your children need more help. They never get away from your support so quickly. And then they get married and then they have grandkids. And then you have to support grandkids. Your support is never ending. (United States)

I think women are not picked to be the leaders. . . . [T]he leadership positions typically tend go to men. . . . [S]ome of that is our own fault, because we don't feel like we could juggle doing more, you know, so in addition to your job and your family all the sudden if you are in a leadership position, I think there is more pressure and more responsibility, so sometimes maybe you back away from that unknowingly. (United States)

If I [take on an additional leadership role,] it's gonna be harder for my family. . . . I don't know if men worry about that as much. (United States)

### **Non-gender-related factors intersect to affect women's career satisfaction**

Many interviewees indicated that job satisfaction was increased by a favorable work-life balance, meaningful patient interaction, and intellectual challenge.

So that is to work with cancer patients. That's it. Because that's where your joy comes from, that's where the rewards come from. It's the relationships that you find with the patients. Solving their problems, finding the best radiation strategy, the best treatment plan etc. Those are . . . like puzzles. It's like solving a puzzle . . . and if you want to solve a puzzle, you will have fun. (United States)

Both Japanese and U.S. participants cited challenges in balancing the tripartite mission of academia.

There is less time to do research, less time to teach, because everybody wants you to treat patients and make money. (United States)

I have to do work for other people without being paid. (Editor, member of institutional review board; Japan)

U.S. participants also emphasized dissatisfaction due to increasing paperwork and documentation requirements. With regard to salaries, U.S. participants often felt that salaries in their field reflected their work (despite concerns about salary gender inequity). Although some Japanese participants felt that their salaries were fair, many expressed concerns about university salaries being generally low.

The salary from the university does not reflect my work at all. In Japan, the salary of the university is too low to live with it, so we have to do part-time job for our living. (Japan)

My salary is nothing to complain about. (United States)

### **Perceptions about the field of radiation oncology**

Many Japanese interviewees perceived the field as being less favorable in Japan.

In [the United States], distinguished physicians are choosing to be a radiation oncologist, but in Japan radiation oncologist is not an attractive job. Therefore, we have to make it more attractive. (Japan)

### **Many women plan to work beyond retirement age**

How long I am going to work? Until I'm too old. . . . When I cannot think. (United States)

I want to do it forever. (Japan)

Others expressed a desire to retire while they are still healthy enough to enjoy other aspects of life, particularly given how hard they worked in their careers: "I would like to have a real retirement . . . and . . . time when I am healthy and can enjoy life . . . and I work really hard" (United States).

### **Career fulfillment influences retirement plans**

Participants rarely emphasized financial concerns, and instead often cited their desire to continue research and patient care as reasons for declining early retirement: "It would be more a desire to continue with my career, engaging with patients, publishing the work I've done" (United States).

### **Gender equity was perceived to be even worse in Japan than in the United States**

#### **Gender disparities in domestic responsibilities were felt to be larger in Japan than the United States**

Although U.S. interviewees frequently cited challenges in raising families, radiation oncology was noted to provide more flexibility than other fields in medicine. Participants reported instances in which men made sacrifices for their wives' careers. Japanese interviewees rarely emphasized the flexibility of radiation oncology, and instead cited difficulties in childrearing due to the persistent expectation that women perform the majority of childrearing.

I think American spouses; they will go for their wives' sake. He will move. (United States)

Hard to have children during training because women are expected to support families. (Japan)

I'm guessing that women in Japan in medicine are kind of like women in the [United States] in medicine were maybe 30 years ago. You know, so I think that probably

you're going to face some of the thing that . . . that I have faced over the years. (United States)

In the United States, I have to say women, they are much more outspoken. (United States)

### Women felt that Japan had less workplace equity

Although participants identified the presence of gender inequity in the United States, both Japanese and U.S. participants felt that there was even less inequity in Japan.

. . . people want women to be in the administrative team. I think there are far more people who think in this way in [the United States]. If it is Japan, they may be satisfied if they put one woman in the team. They may think that is enough. (Japan)

### Recommendations

Both U.S. and Japanese participants frequently cited the need to encourage more women to enter the field of radiation oncology. Most participants would recommend the field of radiation oncology to other female physicians.

### Discussion

A qualitative analysis revealed that, even for older female radiation oncologists in 2 of the most technologically advanced countries (Japan and the United States), sexism and gender-related barriers continue to affect career advancement. Despite attaining high-ranking leadership positions, our study participants rarely anticipated these roles early on in their careers. Many participants reported high career satisfaction, but noted a number of gender-based career challenges, often rooted in broader societal constructs. They also provided insights into cultural differences between the 2 countries, emphasizing perceptions of even less gender equity in Japan compared with the United States.

Few participants anticipated becoming physicians, and even fewer planned to become leaders in academic medicine at early points in their education, with many lacking female physician role models during childhood. Gender constructs that arise during childhood reward boys for aggressiveness and competitiveness during play, but girls are often punished for the same behaviors and told to be more cautious and cooperative.<sup>15</sup> Although men are encouraged to take risks that eventually result in career advancement and success, girls are prohibited from taking those risks and gaining the independence necessary for similar achievements.<sup>15,16</sup>

Due to socially ingrained stereotypic gender roles, constant policing of their behaviors, and a lack of role models, women are often deterred from visualizing a career in academic medicine and may not develop the skill set to succeed in a leadership role. Mentorship programs may help women to see themselves as physicians and leaders.<sup>17</sup> However, mentorship will not necessarily overcome the well-documented external biases that women experience

throughout the pipeline,<sup>1</sup> so both formal institutional and broader societal changes are needed. Solutions include deconstructing gender constructs (eg, girls play with dolls and boys play with blocks), increasing awareness of discrimination (eg, through unconscious bias training), and developing institutional and societal processes to mitigate the effects of discrimination (eg, deliberate inclusion of women in candidate searches).

Gender barriers include concerns related to both childrearing and gender bias irrespective of parental status. Regarding parental status, the collision of biological and professional clocks was a concern for many interviewees in our study. On one hand, participants reported receiving a negative judgment about the effect of childrearing on their work even before they had children, which suggests that women are discriminated against irrespective of their aspirations to have children or not and may be excluded from professional advancement opportunities based on generalizations about physician mothers rather than assessments of their work performance.

Many participants who did have children noted that they continued to perform a disproportionate share of the childrearing, making balancing professional and personal responsibilities challenging. The literature confirms this persistent inequity in domestic responsibilities,<sup>18,19</sup> as well as the notions that female physicians believe that childbearing will negatively impact their careers<sup>20-22</sup> and experience higher rates of depression due to work-family conflicts.<sup>23</sup> Therefore, many women are faced with the difficult choice of delaying childbearing, forgoing professional opportunities, or leaving the workforce all together.<sup>22,24</sup> Although some women may willingly prefer to work within the home or delay/avoid having children, others may be influenced by workplace and domestic inequity, raising the question whether they have a choice at all. Indeed, many participants noted concerns about having to forgo leadership roles to care for their children.

Workplace exclusion and delayed childrearing both can have negative consequences. Workplace exclusion is unethical and causes loss of financial and social capital.<sup>25,26</sup> In addition, delayed childbearing can lead to infertility and pregnancy complications, among other consequences. Indeed, the literature confirms higher rates of infertility among female physicians, who on average delay childrearing compared with the overall population.<sup>27</sup> Infertility is a devastating experience for many women, and leads many to state that they would have attempted conception earlier or pursued a different specialty.<sup>27</sup> However, attempting conception earlier is not a simple solution given that physician women who considered having or had children at earlier career stages in their careers report having less workplace support and receiving active discouragement from departmental leadership than those who had children as faculty.<sup>27,28</sup>

Furthermore, the financial challenges of childcare that women reported in this study would likely be exacerbated

if women choose to begin families while receive lower trainee salaries. Although often stated that there is no perfect time to have children, equitable personal and professional environments would certainly make for a more optimal setting, allowing for society to fully benefit from women who are simultaneously parents and professionals. Concrete solutions include improved child care services,<sup>22</sup> parental leave policies, and more equitable promotion and compensation guidelines that incorporate undervalued work that women are more likely to perform.<sup>29-31</sup> In addition to helping retain women in the workforce and leadership positions, these solutions could decrease some of the burden of specialties with uncontrollable lifestyles (eg, frequent emergencies and evening/weekend hours, long procedures), thereby increasing representation of women by encouraging them to pursue such specialties.

Although childrearing is important, gender barriers are not limited to childrearing concerns. The participants in our study noted gendered double standards, explaining that they are required to adhere to traditional workplace norms (originated in male-dominated structures), but men can use tactics such as power to advance their careers. This phenomenon is well documented in the literature, showing that women are penalized and men rewarded for volubility.<sup>32</sup> Participants also reported frequent instances of their opinions not being valued. Indeed, data show that women are more likely to be interrupted in meetings,<sup>33,34</sup> thereby limiting their influence and minimizing opportunities for meaningful scientific and organization progress.

Additionally, participants noted concerns about salary inequity, which is concordant with the literature showing gender inequity in physician salaries in general<sup>35,36</sup> and radiation oncology specifically.<sup>37</sup> Although some hypothesize that women are paid less simply because they are more likely to work part time, many studies still identify gender disparities after controlling for clinical and research productivity metrics, suggesting that productivity does not fully explain this difference. Future studies should investigate strategies to ensure salary equity and transparency, including increasing the proportions of women in leadership positions, given that salary gaps decreased when the percentages of women in leadership positions increased.<sup>38</sup>

Our study revealed insights into the role of physician women by addressing gender inequity. Women helping other women was a frequent theme, with participants noting that women frequently and intentionally mentored others throughout their careers, with some even delaying retirement to do so. However, some participants also observed the so-called Queen Bee effect, a gender-based form of self-group distancing in which women who achieve career success demean other women and emphasize their stereotypically masculine qualities in response to gender-based power dynamics.<sup>39</sup> Increased representation of women is associated with greater pay equity,<sup>34</sup>

decreased gender discrimination,<sup>36</sup> and increased family and organization support<sup>37</sup> that benefits everyone; thus, women should avoid self-group distancing and instead actively acknowledge and combat gender discrimination by working together.

Our analysis revealed the notion that gender might also play a role in dealing with the emotional burden of caring for oncology patients. Many participants felt that women are more emotionally connected to patients, which could deter women from entering oncology and contribute to burnout for those already in the field. Data show that female oncologists more frequently express empathy,<sup>40</sup> which often positively affects patients, but may lead to greater burnout and depression in their physicians. Given that female physicians already experience higher rates of depression,<sup>23</sup> future research should focus on how to provide emotional support to patients without accelerating burnout in female oncologists. Studies should also explore the role that emotional burden plays in medical student specialty selection, because emotional burden is unlikely to fully explain the underrepresentation of women in radiation oncology compared with the much higher representation in medical oncology.<sup>10,41</sup>

Although interviewees in both countries cited many gender-based challenges, the consensus was that these challenges were more frequent for Japanese women. Japanese participants had perceptions that both workplace and domestic gender inequity were greater in Japan. They rarely identified situations in which men played a significant role in childrearing or domestic responsibilities, which greatly affected their professional aspirations and accomplishments. Because data show that substantial gender-based differences in domestic responsibilities exist for U.S. radiation oncologists<sup>19</sup> and Japanese physicians,<sup>22</sup> the fact that Japanese participants view their experiences as much worse suggests that the situations might be dire.

Japanese interviewees also perceived more discourse about the importance of gender equity in professional settings in the United States, and described the existence of formal or informal institutional policies to address gender equity. Interestingly, U.S. participants rarely emphasized the success of these formal or informal policies, highlighting the fact that increased representation of women has not necessarily translated into their full inclusion or ascent to the highest levels of leadership.<sup>42</sup> Concerns exist in both countries regarding the representation of women throughout the medical pipeline, especially in light of the aforementioned controversy involving the manipulation of test scores to exclude women from a Tokyo medical school.<sup>3</sup> Our findings suggest that achieving gender inequity in radiation oncology and medicine more generally will require both institutional and societal changes. Organizations and countries might first start by recognizing that gender inequity represents an inefficient use of human capital, suggesting that societies who want to maximize their impact might start with equal treatment and representation of women.



Although our interviewees cited many gender-based challenges, non-gender-related factors also contributed to career satisfaction. Participants cited favorable work-life balance, meaningful patient interaction, and intellectual challenge of radiation oncology as drivers of career satisfaction. Many also cited the challenge of balancing the tripartite mission of academia. Evidence suggests that mentorship, targeted faculty development programs, and efforts to destigmatize flexible work schedules and locations can improve physician career satisfaction.<sup>43-45</sup>

## Limitations

The strengths of our study include a well-designed interview guide, a rich set of qualitative data covering multiple domains, and the inclusion of a study population from 2 different continents. Limitations of our study are that only older women and 2 countries were included, limiting the generalizability beyond these populations.

## Conclusion

Despite achieving high levels of career advancement, older female radiation oncologists in both Japan and the United States report a number of career challenges. Although some challenges relate generally to academic medicine, many were rooted in societal and institutional gender norms that contribute to gender inequity. Specialties and institutions should not only play a role in addressing gender inequity in their immediate domains, but also explore how they might influence the broader structures that contribute to gender inequity and limit full scientific advancement.

## Acknowledgments

The authors appreciate the insightful comments and suggestions of Dr. Reshma Jaggi and all the participants for their interest and willingness to contribute to this study.

## References

1. Moss-Racusin CA, Dovidio JF, Brescoll VL, Graham MJ, Handelsman J. Science faculty's subtle gender biases favor male students. *Proc Natl Acad Sci U S A*. 2012;109:16474–16479.
2. Steinpreis RE, Anders KA, Ritzke D. The impact of gender on the review of the curricula vitae of job applicants and tenure candidates: A national empirical study. *Sex Roles*. 1999;41:509–528.
3. Romo V. Tokyo medical school apologizes for test scoring practices to keep women out. Available at: <https://www.npr.org/2018/08/07/636480117/tokyo-medical-school-apologizes-for-test-scoring-practices-to-keep-women-out>. Accessed January 2, 2019.
4. Phillips KW, Liljenquist KA, Neale MA. Is the pain worth the gain? The advantages and liabilities of agreeing with socially distinct newcomers. *Pers Soc Psychol Bull*. 2009;35:336–350.

5. Levine SS, Apfelbaum EP, Bernard M, Bartelt VL, Zajac EJ, Stark D. Ethnic diversity deflates price bubbles. *Proc Natl Acad Sci U S A*. 2014;111:18524–18529.
6. Tsugawa Y, Jena AB, Figueroa JF, Orav E, Blumenthal DM, Jha AK. Comparison of hospital mortality and readmission rates for medicare patients treated by male vs female physicians. *JAMA Intern Med*. 2017;177:206–213.
7. Wallis CJD, Ravi B, Coburn N, Nam RK, Detsky AS, Satkunasivam R. Comparison of postoperative outcomes among patients treated by male and female surgeons: A population based matched cohort study. *BMJ*. 2017;359:j4366.
8. Leung J, Munro PL, James M. Faculty of radiation oncology 2014 workforce census. *J Med Imaging Radiat Oncol*. 2015;59:717–727.
9. Chapman CH, Hwang WT, Deville C. Diversity based on race, ethnicity, and sex, of the U.S. radiation oncology physician workforce. *Int J Radiat Oncol Biol Phys*. 2013;85:912–918.
10. Ahmed AA, Hwang WT, Holliday EB, et al. Female representation in the academic oncology physician workforce: Radiation oncology losing ground to hematology oncology. *Int J Radiat Oncol Biol Phys*. 2017;98:31–33.
11. Personal communication, Japanese Society For Radiation Oncology, Jun 16th 2021.
12. Kaiser Family Foundation. Distributions of physicians by gender. Available at: <https://www.kff.org/other/state-indicator/physicians-by-gender>. Accessed January 22, 2018.
13. Organisation for Economic Cooperation and Development. Health at a glance. [http://dx.doi.org/10.1787/health\\_glance-2017-en](http://dx.doi.org/10.1787/health_glance-2017-en), accessed February 3, 2022.
14. Jones RD, Chapman CH, Holliday EB, et al. Qualitative assessment of academic radiation oncology department chairs' insights on diversity, equity, and inclusion: Progress, challenges, and future aspirations. *Int J Radiat Oncol Biol Phys*. 2018;101:30–45.
15. Fitzsimmons TW, Callan V, Paulsen N. Gender disparity in the C-suite: Do male and female CEOs differ in how they reached the top? *Leadership Quart*. 2014;25:245–266.
16. Sandberg S. Lean in—Women, work and the will to lead. *NHRD Netw J*. 2015;8:137–139.
17. DeCastro R, Sambuco D, Ubel PA, Stewart A, Jaggi R. Mentor networks in academic medicine: Moving beyond a dyadic conception of mentoring for junior faculty researchers. *Acad Med*. 2013;88:488–496.
18. Jolly S, Griffith KA, DeCastro R, Stewart A, Ubel P, Jaggi R. Gender differences in time spent on parenting and domestic responsibilities by high-achieving young physician-researchers. *Ann Intern Med*. 2014;160:344–353.
19. Holliday EB, Ahmed AA, Jaggi R, et al. Pregnancy and Parenthood in Radiation Oncology, Views and Experiences Survey (PROVES): Results of a blinded prospective trainee parenting and career development assessment. *Int J Radiat Oncol Biol Phys*. 2015;92:516–524.
20. Kin C, Yang R, Desai P, Mueller C, Girod S. Female trainees believe that having children will negatively impact their careers: Results of a quantitative survey of trainees at an academic medical center. *BMC Med Educ*. 2018;18:260.
21. Han H, Kim Y, Kim S, Cho Y, Chae C. Looking into the labyrinth of gender inequality: Women physicians in academic medicine. *Med Educ*. 2018;52:1083–1095.
22. Nomura K, Yamazaki Y, Gruppen LD, Horie S, Takeuchi M, Illing J. The difficulty of professional continuation among female doctors in Japan: A qualitative study of alumnae of 13 medical schools in Japan. *BMJ Open*. 2015;5: e005845.
23. Guille C, Frank E, Zhao Z, et al. Work-family conflict and the sex difference in depression among training physicians. *JAMA Intern Med*. 2017;177:1766–1772.
24. Ministry of Health, Labour, and Welfare. Overview of longitudinal survey of newborns in the 21st century. Available at: <http://www.mhlw.go.jp/toukei/saikin/hw/shushoujib/01/index.html>. Accessed January 31, 2018.

25. Wodon Q, Onagoruwa A, Malé C, Montenegro C, Nguyen H, de la Brière B. *How large is the gender dividend? Measuring selected impacts and costs of gender inequality*. Washington, DC: World Bank; 2020.
26. Cavalcanti T, Tavares J. The output cost of gender discrimination: A model-based macroeconomics estimate. *Econ J*. 2016;126:109–134.
27. Stentz NC, Griffith KA, Perkins E, Jones RD, Jagsi R. Fertility and childbearing among American female physicians. *J Womens Health*. 2016;25:1059–1065.
28. Cole S, Arnold M, Sanderson A, Cupp C. Pregnancy during otolaryngology residency: Experience and recommendations. *Am Surg*. 2009;75:411–415.
29. Chapman CH, Jagsi R. The ethical imperative and evidence-based strategies to ensure equity and diversity in radiation oncology. *Int J Radiat Oncol Biol Phys*. 2017;99:269–274.
30. Holliday EB, Siker M, Chapman CH, et al. Achieving gender equity in the radiation oncology physician workforce. *Adv Radiat Oncol*. 2018;3:478–483.
31. Guarino CM, Borden VMH. Faculty service loads and gender: Are women taking care of the academic family? *Res Higher Educ*. 2017;58:672–694.
32. Brescoll VL. Who takes the floor and why: Gender, power, and volatility in organizations. *Admin Sci Quart*. 2011;56:622–641.
33. Hancock AB, Rubin BA. Influence of communication partner's gender on language. *J Lang Soc Psychol*. 2015;34:46–64.
34. Anderson KJ, Leaper C. Meta-analyses of gender effects on conversational interruption: Who, what, when, where, and how. *Sex Roles*. 1998;39:225–252.
35. Jagsi R, Griffith KA, Stewart A, Sambuco D, DeCastro R, Ubel PA. Gender differences in the salaries of physician researchers. *JAMA*. 2012;307:2410–2417.
36. Jena AB, Olenski AR, Blumenthal DM. Sex differences in physician salary in U.S. public medical schools. *JAMA Intern Med*. 2016;176:1294–1304.
37. Guss ZD, Chen Q, Hu C, Guss LG, DeWeese TL, Terezakis SA. Differences in physician compensation between men and women at United States public academic radiation oncology departments. *Int J Radiat Oncol Biol Phys*. 2019;103:314–319.
38. Shin T. The gender gap in executive compensation: The role of female directors and chief executive officers. *Ann Am Acad Polit Soc Sci*. 2012;639:258–278.
39. Staines G, Tavris C, Jayaratne TE. Queen Bee syndrome. *Psychol Today*. 1974;7:55.
40. Pollak KI, Arnold RM, Jeffreys AS, et al. Oncologist communication about emotion during visits with patients with advanced cancer. *J Clin Oncol*. 2007;25:5748–5752.
41. Deville C, Chapman CH, Burgos R, Hwang WT, Both S, Thomas Jr. CR. Diversity by race, Hispanic ethnicity, and sex of the United States medical oncology physician workforce over the past quarter century. *J Oncol Pract*. 2014;10:e328–e334.
42. Knoll MA, Glucksman E, Tarbell N, Jagsi R. Putting women on the escalator: How to address the ongoing leadership disparity in radiation oncology. *Int J Radiat Oncol Biol Phys*. 2019;103:5–7.
43. Strong EA, De Castro R, Sambuco D, et al. Work-life balance in academic medicine: Narratives of physician-researchers and their mentors. *J Gen Intern Med*. 2013;28:1596–1603.
44. Lalani N, Griffith KA, Jones RD, Spratt DE, Croke J, Jagsi R. Mentorship experiences of early-career academic radiation oncologists in North America. *Int J Radiat Oncol Biol Phys*. 2018;101:732–740.
45. DeCastro R, Griffith KA, Ubel PA, Stewart A, Jagsi R. Mentoring and the career satisfaction of male and female academic medical faculty. *Acad Med*. 2014;89:301–311.