Assessment of Differences in Academic Rank and Compensation by Gender and Race/Ethnicity Among United States Academic Radiation Oncologists

Ann C Raldow MD, MPH , Malika L. Siker MD , James A. Bonner MD , Yuhchyau Chen MD, PhD , Fei-Fei Liu MD , James M. Metz MD , Benjamin Movsas MD , Louis Potters MD , Christopher J. Schultz MD , Emily Wilson , Xiaoyan Wang PhD , Tahmineh Romero MS , Michael L. Steinberg MD , Reshma Jagsi MD, DPhil

PII: S2452-1094(23)00039-8
DOI: https://doi.org/10.1016/j.adro.2023.101210
Reference: ADRO 101210

To appear in: *Advances in Radiation Oncology*

Received date: 8 December 2022
Accepted date: 10 February 2023

Please cite this article as: Ann C Raldow MD, MPH , Malika L. Siker MD , James A. Bonner MD , Yuhchyau Chen MD, PhD , Fei-Fei Liu MD , James M. Metz MD , Benjamin Movsas MD , Louis Potters MD , Christopher J. Schultz MD , Emily Wilson , Xiaoyan Wang PhD , Tahmineh Romero MS , Michael L. Steinberg MD , Reshma Jagsi MD, DPhil , Assessment of Differences in Academic Rank and Compensation by Gender and Race/Ethnicity Among United States Academic Radiation Oncologists, *Advances in Radiation Oncology* (2023), doi: https://doi.org/10.1016/j.adro.2023.101210

Assessment of Differences in Academic Rank and Compensation by Gender and Race/Ethnicity Among United States Academic Radiation Oncologists

Ann C Raldow, MD, MPH[1], Malika L. Siker, MD[2], James A. Bonner, MD[3], Yuhchyau Chen, MD, PhD[4], Fei-Fei Liu, MD[5], James M. Metz, MD[6], Benjamin Movsas, MD[7], Louis Potters, MD[8], Christopher J. Schultz, MD[2], Emily Wilson[9], Xiaoyan Wang, PhD[10], Tahmineh Romero[10], MS, Michael L. Steinberg, MD[1], and Reshma Jagsi, MD, DPhil[12]

[1]*Department of Radiation Oncology, University of California, Los Angeles, Los Angeles, CA,*
[2]*Department of Radiation Oncology, Medical College of Wisconsin, Milwaukee, WI,*
[3]*University of Alabama at Birmingham, Birmingham, AL,*
[4]*Department of Radiation Oncology, University of Rochester, Rochester, NY,*
[5]*Radiation Medicine Program, Princess Margaret Cancer Centre, University Health Network, Toronto, ON, Canada,*
[6]*University of Pennsylvania, Department of Radiation Oncology, Philadelphia, PA,*
[7]*Henry Ford Cancer Institute, Detroit, MI,*
[8]*Northwell Health, Lake Success, NY,*
[9]*American Society for Radiation Oncology, Arlington, VA,*
[10]*Department of Medicine, University of California, Los Angeles, Los Angeles, CA,*
[11]*University of California Los Angeles, Los Angeles, CA,*
[12]*Department of Radiation Oncology, University of Michigan, Ann Arbor, MI*

Corresponding author

Ann Raldow, MD, MPH
200 Medical Plaza, Suite B-265
Los Angeles, CA 90095
araldow@mednet.ucla.edu
(310) 825-9771

Manuscript Word Count: 2997

Task Force Members' Disclosure Statements

SCAROP and departmental resources were used to fund this manuscript. No external resources were used. All disclosures for authors are listed.

Ann Raldow: Viewray (research, consulting), Joseph Drown Foundation (research), Intelligent Automation, Inc. (research); **Malika Siker** reported no disclosures; **James A. Bonner**: Bristol Meyers (royalties/licenses, honoraria, travel), Cel-Sci (consulting, honoraria), Eli Lilly (royalties/licenses, honoraria, travel), ICON plc (consulting), Merck Serono (royalties/licenses, consulting, honoraria, travel); **Yuhchyau Chen** reported no disclosures; **Fei-Fei Liu:** Canadian Institute of Health Research (research),

Canadian Medical Protective Association (expert testimony); Canadian Institutes of Cancer Research (leadership role); **James Metz:** Varian (honoraria), IBA (honoraria); **Benjamin Movsas:** Varian (research, travel), Philips (research), Viewray (research); **Louis Potters:** Smarter Radiation Oncology Health, LLC (leadership), RO-ILS (participant); **Chris Schultz** reported no disclosures; **Emily Wilson** reported no disclosures; **Xiaoyan Wang** reported no disclosures; **Tahmineh Romero** reported no disclosures; **Michael Steinberg**: Viewray (consulting), Matthew Habercorn Attorney (expert testimony), Wiggins, Sewell & Ogletree (expert testimony), Manatt, Phelps & Phillips (expert testimony), Schmid & Voiles (expert testimony); **Reshma Jagsi**: Equity Quotient (Advisory board); Greenwall Foundation (research, honoraria, travel), Doris Duke Charitable Foundation (research, honoraria, travel), Komen Foundation (research), Blue Cross Blue Shield of Michigan (research), Genentech (research), Sherinian and Hasso (expert witness), Dressman Benzinger LaVelle (expert testimony), and Kleinbard LLC (expert testimony).

Abstract

Purpose/Objective(s): Advancing equity, diversity and inclusion in the physician workforce is essential to providing high-quality and culturally responsive patient care and has been shown to improve patient outcomes. To better characterize equity in the field of radiation oncology, we sought to describe the current academic radiation oncology workforce including any contemporary differences in compensation and rank by gender and race/ethnicity.

Methods: We conducted a retrospective cohort study using data from the SCAROP 2018 Financial Survey. Multivariable logistic regression models were used to identify factors associated with associate or full professor rank. Compensation was compared by gender and race/ethnicity overall and stratified by rank and was further analyzed using multivariable linear regression models.

Results: Of the 858 academic radiation oncologists (ROs) from 63 departments in the US in the sample, 33.2% were female; 65.2% were White, 27.2% were Asian and 7.6% were underrepresented in medicine (URiM). There were 44.0% assistant professors, 32.0% associate professors, and 22.8% full professors. Multivariable logistic regression analysis for factors associated with associate or full professor rank did not reveal statistically significant associations

between gender or race/ethnicity with academic rank (OR 0.86, 95% CI 0.56-1.32, p=0.48 for gender and OR 0.81, 95% CI 0.5-1.30 p=0.37 for Asian vs. White and OR 0.69, 95% CI 0.31-1.55 p=0.37 for URiM vs. White), but confidence intervals were wide due to sample size, and point estimates were <1. Similarly, multivariable linear regression analysis modeling the log relative total compensation did not detect statistically significant differences between radiation oncologists by gender (-1.7%, 95% CI -6.8%-3.4%) p= 0.51 for female vs. male) or race/ethnicity (-1.6%, 95% CI -7.3%-4.0% p=0.57 for Asian vs. White and -3.0%, 95% CI -12.1%-6.0% p=0.51 for URiM vs. White).

Conclusion: The low numbers of women and faculty with URiM race/ethnicity in this radiation oncology faculty sample limits the ability to compare career trajectory and compensation by those characteristics. Given that point estimates were <1, our findings do not contradict larger multi-specialty studies that suggest an ongoing need to monitor equity.

Introduction

Advancing equity, diversity and inclusion in the physician workforce is essential to providing high-quality and culturally responsive patient care, and has been shown to improve patient outcomes[1–5]. It is also a vital component in ensuring effective recruitment, engagement, and retention of students, residents, staff, and faculty. Despite a call from our licensing and governing bodies to cultivate a diverse and inclusive workforce reflective of the communities we serve, disparities remain in compensation and academic promotion for women and individuals from groups that are underrepresented in medicine (URiM) across specialties[4–10].

Radiation oncology is one of the least diverse fields in terms of representation of women and URiM individuals compared to other specialties[11–13]. Within radiation oncology, gender is associated with many aspects of a physician's career, including academic advancement, scholarly activity, funding for research, academic position, Medicare reimbursement, representation in leadership positions, and disease site(s) treated[14–20]. Analogous disparities exist within the radiation oncology workforce by race. For example, the leaders of our field are mostly White men, with only 5 of the 110 Society of Chairs of Academic Radiation Oncology Programs (SCAROP) member being URiM in 2022 (Emily Wilson, personal communication, June 6, 2022). Studies of multi-specialty samples have suggested ongoing disparities in compensation by both gender and race. Addressing the underlying causes of gender and race-based income differences should be a priority, particularly as we recruit more women and URiM physicians into our workforce, and given the potential for ongoing perpetuation of social injustice by reducing the power and wealth accumulation of marginalized groups that propagates effects to subsequent generations.

SCAROP conducts a survey every 2-3 years that collects information regarding compensation, as well as physician and practice characteristics of radiation oncology departments, providing a comprehensive overview of the academic radiation oncology workforce. Given a growing interest in better understanding and addressing inequities within the field of radiation oncology, we sought to describe the current academic radiation oncology workforce, and assess any contemporary differences in compensation and rank by gender and race/ethnicity.

Methods

We conducted a retrospective cohort study utilizing data from the SCAROP 2018 Financial Survey. This study was approved by the University of California, Los Angeles Institutional Review Board.

Survey Description

The survey included data on 858 academic radiation oncologists from 63 departments in the United States that had membership in SCAROP (n=108; survey response rate of 58.3%). Representatives from each department were asked to provide de-identified information regarding their individual faculty members. Potential participating departments were identified by their chair's membership in SCAROP and were invited to participate in completion of the SCAROP 2018 Financial Survey *via* e-mail with a unique link for each department. The survey was administered *via* the Qualtrics (Qualtrics, Provo, UT) portal, and launched on January 2, 2019. Five reminder emails were sent to department chairs through a 10-week field period, which

closed on March 17, 2019. Financial information was to be reported for the most recent fiscal year.

Variables

The 2018 SCAROP survey included items related to department characteristics, physician demographics, and income. Departmental variables included region of country (West, Midwest, South, Northeast), institutional funding (public *vs*. private), and size (whether the department had 50 or more faculty members). Physician-specific variables included position (department chair *vs*. division/section chief *vs*. residency program director *vs*. other faculty), full-time classification (yes *vs*. no *vs*. missing), physician scientist classification (yes *vs*. no *vs*. missing), years of experience (0-4 years *vs*. 5-9 years *vs*. 10-14 years *vs*. 15-19 years, *vs*. 20+ years *vs*. missing), years in the department (0-4 years vs. 5-9 years vs. 10-14 years vs. 15-19 years, vs. 20+ years vs. missing), board certification status (yes vs. no vs missing), gender (male vs. female vs. missing), race/ethnicity (White vs. Asian vs URiM vs. missing), site/primary location of practice (main campus vs. satellite campus), academic rank (instructor vs. assistant professor vs associate professor vs. professor vs. missing/not applicable), tenure track (yes vs. no. vs missing/not applicable), and formal education level (MD, DO with a PhD vs. MD, DO with a Master's Degree, vs MD, DO vs. other vs. missing), and total compensation. Physicians with the following backgrounds were classified as URiM: Hispanic, Latino or Spanish origin; Black or African American; American Indian or Alaskan Native; Native Hawaiian or Other Pacific Islander; or multiple selections with at least one background category classified as URiM. The number of physicians in each of these categories were pooled into the single URiM category for the main analyses as numbers were not sufficiently high to meaningfully analyze separately.

Total compensation was defined as base compensation plus incentive bonus during the most recent fiscal year.

Data Analysis

For 2018 survey data on physicians, descriptive statistics such as frequency and percentage were summarized and presented in tables for variables related to department characteristics, physician demographics, both overall (Table 1), by gender (Supplementary Table 1) and by race/ethnicity (Supplementary Table 2). Chi-square tests were used to assess univariate association of these categorical variables and academic rank with gender and race/ethnicity. Multivariable logistic regression models were used to identify factors associated with associate or full professor rank. A full model was first fitted with main effects, as well as all the first-order pairwise interaction terms related to gender and race/ethnicity, respectively. Backward stepwise elimination of non-significant (threshold: $p<0.05$) variables was performed to reach a final model. Odds ratios, the corresponding 95% confidence intervals and p-values were reported (Table 2).

The natural log relative total compensation was calculated by dividing the total compensation by the minimum compensation based on gender, race, geographic region and academic rank, and then calculating the natural log. This allows for simple interpretation of differences * 100 as percent increases or decreases when differences are close to 0. For differences close to ±1, the differences are a slight underestimation of the true percentage changes. For example, log relative means of 0.88 for Asian professors vs 0.80 for Middle Eastern or North African professors indicates that the mean compensation for an Asian professor in our dataset is about 8% [=((0.88-.80)*100)%] higher for Asian professors as compared to Middle Eastern or North African professors. Log total compensation was stratified by gender/rank

(Supplementary Table 3A) and gender/region/rank (Supplementary Table 3B). Mean, standard deviation, median and inter-quartile range of the log total compensation relative to the reference subgroup were reported. Comparisons of total compensation between men and women were conducted via F-tests within a two-way factorial ANOVA framework (gender by rank) and p-values were reported. Similar analyses were performed for total compensation by race/ethnicity/rank (Supplementary Table 4A), and race/ethnicity/region/rank (Supplementary Table 4B). Since aggregation can limit the ability to measure the effects of the most severe forms of racism, we performed additional analyses examining differences in total compensation by ungrouped race/ethnicity and rank (Table 5 and Supplementary Table 5).

To evaluate percent change in total compensation between genders and race/ethnicity, log relative compensation was modeled as a response variable in a multivariable linear regression model in which gender, race/ethnicity, geographic region, departmental size, institutional funding source, full-time classification, site/primary location of practice, tenure track, physician scientist classification, years of experience, years in the department, board certification status, and formal education level were included as predictors (Table 3). A similar multivariable linear regression model including academic rank as an additional and possibly mediating independent variable was performed to evaluate percent change in total compensation between genders and race/ethnicity (Table 4). These multivariable linear regression models were repeated for ungrouped races/ethnicities (Table 5). Results were summarized using point estimates, 95% CI and p-values.

To compare statistically detectable differences with meaningful differences in associate/full professor representation as well as total compensation between White and URiM

radiation oncologists, power calculations (80% power) for minimum detectable effect sizes were performed. Power calculations included group sample sizes of 508 White and 59 URiM radiation oncologists and two-sided t-tests allowing for unequal variance with a significance level (alpha) of 0.05. T-tests provide a conservative estimate for minimum detectable effect size in multivariable regression. Power calculations were repeated for American Indian, Alaskan Native, Native Hawaiian or other Pacific Islander (n=5), Black or African American (n=40), and Hispanic, Latino, or Spanish origin (n=14) vs. White excluding MENA radiation oncologists (n=455). For the power calculation of associate/full professor representation, a multivariable logistic regression modeling the binary outcome associate/full professor (yes or no) was performed with 0.540 baseline probability of associate or full professor representation. An adjustment was made since multiple regression of the race variable on the other independent variables in the logistic regression obtained an R-Squared of 0.04. All statistical analyses were carried out using statistical software SAS Version 9.4 and R version 4.0.0 [21,22].

Results

The departmental and demographic characteristics associated with all identified radiation oncologists (n=858) are shown in Table 1. The survey included radiation oncologists from 63 departments; 270 (33.2%) physicians were female, 477 (60.5%) were White, 212 (27.2%) were Asian and 59 (7.6%) were from URiM backgrounds. There were 361 (44.0%) assistant professors, 262 (32.0%) associate professors, and 187 (22.8%) full professors. The largest proportion of radiation oncologists in the sample practiced in the South (n=287; 34.1%), followed by the Northeast (n=238; 28.3%), the Midwest (n=161; 19.1%), and the West (n=156;

18.5%). Most radiation oncologists in the sample practiced at a publicly funded institution (n=480; 55.9%) and in departments with 50 or fewer faculty members (n=508; 59.2%).

On univariate analyses by gender, women were less likely to work full-time (91.0% women vs. 95.1% men; p=0.02) and be physician-scientists (13.8% women vs. 19.8% men; p=0.05) compared to men (Supplementary Table 1). As compared to men, women were more likely to practice in a department with more than 50 faculty members (44.4% women vs. 37.3% men; p=0.05). Academic rank by gender was not significantly different (p=0.16). On univariate analyses by race/ethnicity, the proportion of White, Asian and URiM radiation oncologists varied significantly based on geographical region (p<0.001), type of institutional funding (p=0.03), tenure track position (p<0.001), physician-scientist classification (p=0.02), years of practice experience (p<0.001), and years in the department (p=0.03) but not academic rank (p=0.32) (Supplementary Table 2). The largest proportion of URiM radiation oncologists (n=29; 50.9%) practiced in the South, followed by the West (n=12; 21.1%), Midwest (n=10; 17.5%), and the Northeast (n=6; 10.5%). In contrast, the highest proportion of Asian radiation oncologists practiced in the Northeast (n=64; 30.6%), followed by the West (n=60; 28.7%), the South (n=57; 27.3%) and the Midwest (n=28; 13.4%). With respect to type of institutional funding, 72.9% of URiM radiation oncologists practiced in a publicly funded institution versus 57.1% of Asian and 54.9% of White radiation oncologists. The minority held tenure track positions: 46.0% of URiM, 27.3% of Asian and 43.3% of White radiation oncologists. A smaller proportion of URiM radiation oncologists were classified as physician-scientists (10.7%), as compared to Asian (23.7%) and White (16.2%) radiation oncologists.

Multivariable logistic regression analysis for factors associated with associate or full professor rank showed that gender and race/ethnicity were not significantly associated with

academic rank (Table 2; OR 0.86, 95% CI 0.56-1.32, p=0.48 for female vs. male and OR 0.81, 95% CI 0.5-1.30 p=0.37 for Asian vs. White and OR 0.69, 95% CI 0.31-1.55 p=0.37 for URiM vs. White). Of note, these analyses had 80% power to detect a minimum effect size of OR= 0.40 for associate or full professors when comparing URiM vs White radiation oncologists. Radiation oncologists practicing in the Midwest (OR 0.27, 95% CI 0.14-0.52 vs West p<0.001) or Northeast (OR 0.51, 95% CI 0.27-0.96 vs. West; p=0.04) or at an institution with 50 or less faculty members (OR 0.60, 95% CI 0.38-0.93; p=0.02) were less likely to be associate or full professors. Radiation oncologists practicing at the main campus location (OR 2.36, 95% CI 1.50-3.70; p=0.002), with more years of practice experience (OR 0.12, 95% CI 0.05-0.29 0-4 years vs 5-9 years, p< 0.001 and OR 4.38, 95% CI 2.24-8.58 20+ years vs 5-9 years, <=0.001), and more years in the department (OR 0.41, 95% CI 0.23-0.71 0-4 years vs 5-9 years, p=0.002 and OR 5.00, 95% CI 1.66-15.02 20+ years vs. 5-9 years, p=0.0041) were significantly more likely to be associate or full professors.

Overall, there were no statistically significant differences in log relative mean total compensation between males and females across different academic ranks (Supplementary Table 3A) on univariate analyses. However, we observed statistically significant differences among male and female associate professors in the West (15% higher compensation p=0.036) and assistant professors in the Northeast (13% higher compensation; p=0.032) (Supplementary Table 3B). However, once adjusted for predictors of total compensation such as geographic region, departmental size, institutional funding source, full-time classification, site/primary location of practice, tenure track, physician scientist classification, years of experience, years in the department, board certification status, and formal education level, there were no statistically significant differences across genders (Table 3: -1.7%, 95% CI -6.8%-3.4%) p= 0.51 and Table 4

including academic rank as an additional and possibly mediating independent variable: -0.0%, 95% CI -5.0%-4.7% p= 0.938 for female vs. male, respectively)

Overall, there were no significant differences in total compensation between White, Asian and URiM instructors, assistant professors, associate professors, or full professors on univariate analyses (Supplementary Table 4A). In the South, URiM associate professors had significantly higher mean salaries as compared to Asian (16.0% higher compensation) and White (13.0% higher compensation) associate professors (overall p=0.02) (Supplementary Table 4B). There were no significant differences in total compensation by ungrouped race/ethnicity and academic rank (Supplementary Table 5, p-values > 0.05 across all academic ranks). In a multivariable linear regression analysis modeling the log relative total compensation as the outcome variable, there were no statistically significant differences between radiation oncologists by race/ethnicity (Table 3: -1.6%, 95% CI -7.3%-4.0% p=0.57 for Asian vs. White and -3.0%, 95% CI -12.1%-6.0% p=0.51 for URiM vs. White; and Table 4 including academic rank as an additional and possibly mediating independent variable: -3.0%, 95% CI -8.3%-2.4% p=0.28 for Asian vs. White and -2.0%, 95% CI -10.6%-6.5% p=0.64 for URiM vs. White) for ungrouped race/ethnicity (Table 5A: 1.0%, 95% CI -25.6%-27.7% p=0.94 for American Indian, Alaskan Native, Native Hawaiian or Other Pacific Islander vs. White excluding Middle Eastern or North African (MENA), -3.3%, 95% CI -14.8%-8.1% p=0.57 for Black or African American vs. White excluding MENA, -3.5%, 95% CI -20.2%-13.2% p=0.75 for Hispanic, Latino or Spanish origin vs. White excluding MENA; Table 5B including academic rank as an additional and possibly mediating independent variable: 3.7%, 95% CI -21.3%-28.7% p=0.77 for American Indian, Alaskan Native, Native Hawaiian or Other Pacific Islander vs. White excluding Middle Eastern or North African (MENA), -2.4%, 95% CI -13.1%-8.3% p=0.66 for Black or African

American vs. White excluding MENA, -2.6%, 95% CI -18.2%-13.1% p=0.75 for Hispanic, Latino or Spanish origin vs. White excluding MENA;). Our study had 80% power to detect a minimum 10% difference in total compensation between URiM and White radiation oncologists. In addition, our study had 80% power to detect a 20% difference for American Indian, Alaskan Native, Native Hawaiian or other Pacific Islander vs. White excluding MENA radiation oncologists, a 30% difference for Hispanic, Latino, or Spanish origin radiation oncologists vs. White excluding MENA radiation oncologists, and a 10% difference for Black or African American vs. White excluding MENA radiation oncologists.

Discussion

To better understand how gender and racial equity may relate to professional advancement and financial compensation within the field of medicine more generally and the specialty of radiation oncology in particular, we sought to describe contemporary differences in academic achievement and compensation by race/ethnicity and gender in this specialty group. In the current study of 858 academic radiation oncologists from 63 departments in the United States, we observed that women were underrepresented in the academic radiation oncology workforce (constituting only 33.2% of our sample, *vs*. half of the total US population and half of all current medical students)[23,24]. Similarly, individuals from URiM backgrounds were markedly underrepresented, constituting only 7.6% of this sample, compared to approximately 33.5% of the general population in the United States[25]. Unfortunately, the small size of the specialty in combination with this under-representation of women and those of URiM race/ethnicity constrains the power of this study to detect only large differences between groups who differ based on those characteristics. We did observe important differences in practice type and

location by radiation oncologist race/ethnicity. Specifically, URiM radiation oncologists were more likely to practice in the South and at publicly funded universities, and only a small proportion of URiM radiation oncologists were classified as physician-scientists, compared to Asian or White radiation oncologists.

Although previous reports have documented substantial underrepresentation of women in the most senior positions of radiation oncology, with disproportionately fewer female chairs, American Society for Radiation Oncology (ASTRO) board members and presidents, or gold medal recipients, gender was not predictive of higher academic rank in our analysis[16,26,27]. Given that this study demonstrates that a third of all full professors in our field are women, similar to the junior ranks, the pool of talent from which to draw future leaders should be sufficient to permit diversification of gender at the most senior levels. On the other hand, it was concerning to observe that both junior and senior positions hover at around a third, when half of the medical student body identify as women. This indicates that the field of radiation oncology needs to not only ensure that female full professors are able to achieve senior leadership positions and recognition, but also to prioritize recruiting from the full pool of diverse and talented medical students who would continue to enrich our specialty[19,28].

The 2017 American Society for Radiation Oncology (ASTRO) Radiation Oncology Workforce Study demonstrated that URiM individuals comprised only a small minority of the radiation oncology physician workforce (2.2% Black or African American, 2.3% Hispanic, Latino or Spanish origin, 0.2% American Indian or Alaskan Native, 0.0% Native Hawaiian or Pacific Islander, 1.1% other, and 4.0% more than one race/ethnicity selected), and only 5 of the 110 SCAROP members are URiM (Emily Wilson, personal communication, June 6, 2022)[29]. A recent cross-sectional study suggested that the representation of women has increased among

academic radiation oncology faculty over time, but URiM representation continued to lag[30]. With our sample of 63 responding institutions, we did not detect that race/ethnicity was significantly associated with associate or full professor rank, but confidence intervals were wide due to limited sample size, and point estimates were <1, suggesting that a difference may indeed exist that our study could not detect. A prior study of 128 academic medical centers reported that promotion rates for Black and Hispanic faculty were lower than those for White faculty for both assistant to associate professor and from associate to full professor[6]. Another study reported that even after adjusting for cohort (representing faculty who attained their rank during five different time periods from 1980-1989), gender, tenure status, degree, department, medical school type, and NIH award status, URiM faculty were still less likely to be promoted compared to White physicians[10]. Given the OR of 0.69 (p=0.37) for URiM *vs.* White radiation oncologists at the associate or full professor rank in the multivariable analysis, our study might not have had sufficient statistical power to detect a true and meaningful underlying disparity.

Overall, there were no significant differences in total compensation between male and female radiation oncologists by academic rank. However, male associate professors made a significantly higher salary (15%) than female associate professors in the West and male assistant professors made a significantly higher salary (13%) than female assistant professors in the Northeast. After adjusting for other potentially mechanistic variables in a multivariable regression model, total compensation did not differ significantly between males and females. Although our analysis did not find statistically significant compensation gaps between male and female academic radiation oncologists, reasons for compensation disparities by gender may include gender differences in negotiation as well as conscious and unconscious biases. Studies have shown that women are less likely to initiate negotiations and negotiated lower salaries as

compared to their male counterparts[31–33]. In addition, women who negotiate are often perceived as too demanding and less likeable. These perceptions can in turn, lead to hesitancy on the part of women to negotiate for higher salaries while ironically also impeding their access to other resources necessary to achieve the success that leads to pay raises[34–36]. Unconscious biases regarding the value of women's contributions to the workforce could also result in compensation inequalities[37]. We must therefore remain vigilant to avoid differences in total compensation due to biases and differences in negotiation behaviors.

Overall, there were no significant differences in total compensation between White, Asian and URiM academic radiation oncologists. Although power is limited due to small numbers, additional analyses designed to measure the effects of the most severe forms of racism by ungrouping race/ethnicity also did not detect any significant differences in total compensation (Table 5 and Supplementary Table 5). Nevertheless, it is important to interpret these findings in the context of the broader literature on compensation disparities in medicine. In a 2017 Medscape compensation survey, White physicians reported earning approximately $303,000 yearly, followed by Asian ($283,000), Hispanic or Latino ($271,000), and black ($262,000) physicians[38]. A study on primary care physicians reported that Black males had lower yearly incomes as compared to their White male counterparts, after adjusting for differences in work effort, physician characteristics, and practice characteristics.[39] The most recent AAMC report showed that across all faculty ranks, except those in clinical science departments/specialties with MD-PhD degrees, White faculty had a higher median compensation than faculty of any other race/ethnicity[40]. Although it is reassuring that we did not find the large differences of the magnitude that this small sample was powered to detect, these findings should not be taken as evidence that there are no racial or ethnic differences in compensation in our field.

We acknowledge that our study has several limitations. These observational data represent the snapshot of academic departments during 2018, and examining these same trends at multiple time points would be useful to add more context to our findings, particularly because gaps may widen or narrow with time, especially given the disruptions that have occurred since the outbreak of the COVID-19 pandemic. In addition, the 2018 SCAROP survey data is provided by individual departments and may be imperfect. Although the 58.3% response rate may influence results and limit statistical power, this data set remains the best available information to date on the topic. It is important to note that socially meaningful differences may not be statistically significant in a study of this size. Finally, we studied only academic departments, and our findings cannot be generalized to understand whether disparities might also exist in non-academic practice.

In summary, our study showed that women and individuals from URiM backgrounds were dramatically underrepresented in the field of radiation oncology, but were not disproportionately underrepresented at any particular rank. Although male associate professors made a significantly higher salary (15%) than female associate professors in the West and male assistant professors made a significantly higher salary (13%) than female assistant professors in the Northeast on univariate analyses, there were no significant compensation gaps between genders when adjusted for other relevant variables. Our study affirms that female and URiM representation in the radiation oncology workforce continues to be low and does not reflect the diversity of our patient population. Diversity challenges assumptions, broadens perspectives, and enhances cultural humility[41,42]. Thus, ongoing efforts to improve gender and URiM representation in our field should continue to be a specialty-wide area of focus and resource allocation. Importantly, the ASTRO Board of Directors identified Diversity and Inclusion as one of five core values in its

Strategic Plan in 2017, and the Committee on Health Equity, Diversity and Inclusion (CHEDI) has been elevated to become a full ASTRO Council with Board representation. CHEDI's vision is to advance a culture of inclusive excellence that will foster a diverse workforce and improve health equity in radiation oncology. Future work should continue to ensure that there is active promotion of women and URiM in radiation oncology to ensure continuing excellence in our field and the delivery of culturally compassionate care for our patients.

References

1. Greenwood, B. N., Hardeman, R. R., Huang, L. & Sojourner, A. Physician-patient racial concordance and disparities in birthing mortality for newborns. *Proc. Natl. Acad. Sci. U. S. A.* **117**, 21194–21200 (2020).
2. Alsan, M., Garrick, O. & Graziani, G. Does Diversity Matter for Health? Experimental Evidence from Oakland. *Am. Econ. Rev.* **109**, 4071–4111 (2019).
3. Saha, S. & Beach, M. C. Impact of Physician Race on Patient Decision-Making and Ratings of Physicians: a Randomized Experiment Using Video Vignettes. *J. Gen. Intern. Med.* **35**, 1084–1091 (2020).
4. Tsugawa, Y. *et al.* Comparison of Hospital Mortality and Readmission Rates for Medicare Patients Treated by Male vs Female Physicians. *JAMA Intern. Med.* **177**, 206 (2017).
5. Greenwood, B. N., Carnahan, S. & Huang, L. Patient–physician gender concordance and increased mortality among female heart attack patients. *Proc. Natl. Acad. Sci.* **115**, 8569–8574 (2018).
6. Nunez-Smith, M. *et al.* Institutional variation in the promotion of racial/ethnic minority faculty at US medical schools. *Am. J. Public Health* **102**, 852–858 (2012).
7. The State of Women in Academic Medicine. The Pipeline and Pathway to Leadershi. Washington, DC: Association of American Medical Colleges, 2013:2013–2014.
8. Wehner, M. R., Nead, K. T., Linos, K. & Linos, E. Plenty of moustaches but not enough women: cross sectional study of medical leaders. *BMJ* **351**, h6311 (2015).
9. Carr, P. L., Gunn, C. M., Kaplan, S. A., Raj, A. & Freund, K. M. Inadequate progress for women in academic medicine: findings from the National Faculty Study. *J. Womens Health 2002* **24**, 190–199 (2015).
10. Fang, D., Moy, E., Colburn, L. & Hurley, J. Racial and ethnic disparities in faculty promotion in academic medicine. *JAMA* **284**, 1085–1092 (2000).

11. Deville, C. *et al.* I Can't Breathe: The Continued Disproportionate Exclusion of Black Physicians in the United States Radiation Oncology Workforce. *Int. J. Radiat. Oncol. Biol. Phys.* **108**, 856–863 (2020).
12. Deville, C. *et al.* Diversity in Graduate Medical Education in the United States by Race, Ethnicity, and Sex, 2012. *JAMA Intern. Med.* **175**, 1706–1708 (2015).
13. Chapman, C. H., Hwang, W.-T. & Deville, C. Diversity based on race, ethnicity, and sex, of the US radiation oncology physician workforce. *Int. J. Radiat. Oncol. Biol. Phys.* **85**, 912–918 (2013).
14. Holliday, E. B. *et al.* Gender Differences in Publication Productivity, Academic Position, Career Duration, and Funding Among U.S. Academic Radiation Oncology Faculty: *Acad. Med.* **89**, 767–773 (2014).
15. Choi, M., Fuller, C. D. & Thomas, C. R. Estimation of Citation-Based Scholarly Activity Among Radiation Oncology Faculty at Domestic Residency-Training Institutions: 1996–2007. *Int. J. Radiat. Oncol.* **74**, 172–178 (2009).
16. Chapman, C. H. & Jagsi, R. The Ethical Imperative and Evidence-Based Strategies to Ensure Equity and Diversity in Radiation Oncology. *Int. J. Radiat. Oncol.* **99**, 269–274 (2017).
17. Lalani, N. *et al.* Mentorship Experiences of Early-Career Academic Radiation Oncologists in North America. *Int. J. Radiat. Oncol.* **101**, 732–740 (2018).
18. Valle, L. *et al.* Assessment of Differences in Clinical Activity and Medicare Payments Among Female and Male Radiation Oncologists. *JAMA Netw. Open* **2**, e190932 (2019).
19. Beeler, W. H. *et al.* Gender, Professional Experiences, and Personal Characteristics of Academic Radiation Oncology Chairs: Data to Inform the Pipeline for the 21st Century. *Int. J. Radiat. Oncol. Biol. Phys.* **104**, 979–986 (2019).
20. Jagsi, R. *et al.* Women's Representation Among Members and Leaders of National Medical Specialty Societies. *Acad. Med. J. Assoc. Am. Med. Coll.* **95**, 1043–1049 (2020).
21. SAS Institute Inc. 2013. Cary, NC.

22. R Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.
23. AAMC. https://www.aamc.org/media/6116/download. Accessed March 5, 2021.
24. United States Census Bureau. https://www.census.gov/quickfacts/fact/table/US/PST045219. Accessed March 5, 2021.
25. 'US Census Bureau July 1 2019 Estimates' (web). United States Census Bureau. July 2019. Retrieved June 6, 2020.
26. Knoll, M. A., 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.* **103**, 5–7 (2019).
27. Jagsi, R. & Tarbell, N. J. Women in Radiation Oncology: Time to Break Through the Glass Ceiling. *J. Am. Coll. Radiol.* **3**, 901–903 (2006).
28. Jones, R. D. *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.* **101**, 30–45 (2018).
29. Fung, C. Y. *et al.* The American Society for Radiation Oncology 2017 Radiation Oncologist Workforce Study. *Int. J. Radiat. Oncol. Biol. Phys.* **103**, 547–556 (2019).
30. Kamran, S. C., Niemierko, A., Deville, C. & Vapiwala, N. Diversity Trends by Sex and Underrepresented in Medicine Status Among US Radiation and Medical Oncology Faculty Over 5 Decades. *JAMA Oncol.* (2021) doi:10.1001/jamaoncol.2021.6011.
31. Stevens, C. K., Bavetta, A. G. & Gist, M. E. Gender differences in the acquisition of salary negotiation skills: the role of goals, self-efficacy, and perceived control. *J. Appl. Psychol.* **78**, 723–735 (1993).
32. Small, D. A., Gelfand, M., Babcock, L. & Gettman, H. Who goes to the bargaining table? The influence of gender and framing on the initiation of negotiation. *J. Pers. Soc. Psychol.* **93**, 600–613 (2007).

33. Sarfaty, S. *et al.* Negotiation in academic medicine: a necessary career skill. *J. Womens Health 2002* **16**, 235–244 (2007).

34. Bowles, H. R., Babcock, L. & Lai, L. Social incentives for gender differences in the propensity to initiate negotiations: Sometimes it does hurt to ask. *Organ. Behav. Hum. Decis. Process.* **103**, 84–103 (2007).

35. Lalani, N., Griffith, K. A., Jones, R. D., Cuneo, K. & Jagsi, R. Salary and Resources Provided to Junior Faculty in Radiation Oncology. *Int. J. Radiat. Oncol. Biol. Phys.* **103**, 310–313 (2019).

36. Sambuco, D. *et al.* Negotiation in academic medicine: narratives of faculty researchers and their mentors. *Acad. Med. J. Assoc. Am. Med. Coll.* **88**, 505–511 (2013).

37. Carney D, Nosek BA, Greenwald AG, Banaji MR, Baumeister R, Vohs K. Implicit Association Test (IAT). In: Baumeister R, Vohs K, editors. Encyclopedia of Social Psychology. Thousand Oaks, CA: SAGE Publications Inc, 2007:463–6.

38. S. Grisham Medscape Physical Compensation Report 2017 WebMD LLC (2017) Available at: https://www.medscape.com/slideshow/compensation-2017-overview-6008547, Accessed 9th Dec 2021.

39. Weeks, W. B., Wallace, T. A. & Wallace, A. E. How Do Race And Sex Affect The Earnings Of Primary Care Physicians? *Health Aff. (Millwood)* **28**, 557–566 (2009).

40. Dandar VM, Lautenberger DM, Garrison G. Exploring faculty salary equity at U.S. medical schools by gender and race/ethnicity. Washington, DC: Association of American Medical Colleges, October 2021 (https:// www.aamc.org/data-reports/workforce/ report/exploring-faculty-salary-equity-us - medical-schools-gender-and-race/ ethnicity).

41. Gomez, L. E. & Bernet, P. Diversity improves performance and outcomes. *J. Natl. Med. Assoc.* **111**, 383–392 (2019).

42. Cooper-Patrick, L. *et al.* Race, gender, and partnership in the patient-physician relationship. *JAMA* **282**, 583–589 (1999).

Table 1: 2018 Survey Data for Academic Radiation Oncologists, Descriptive Statistics (categorical variables)

Variable	Level	N (%) = 858
Organizational Region AAMC	Western Region	156 (18.5)
	Midwestern Region	161 (19.1)
	Southern Region	287 (34.1)
	Northeastern Region	238 (28.3)
	Missing	16
Which of the following best describes your institution?	Publicly funded	480 (55.9)
	Privately funded	378 (44.1)
Do you have more than 50 faculty members?	Yes	350 (40.8)
	No	508 (59.2)
Occupation	Physician Department Chair	55 (6.4)
	Physician Division / Section Chief	93 (10.8)
	Physician Residency Program Director	50 (5.8)
	Physician Faculty	660 (76.9)
Full-time Classification	Yes	787 (93.5)
	No	55 (6.5)
	Missing	16
Physician Scientist	Yes	137 (18.1)
	No	620 (81.9)
	Missing	101

Variable	Level	N (%) = 858
Years of Experience Categories	0 to 4 years	166 (20.7)
	5 to 9 years	176 (22.0)
	10 to 14 years	138 (17.2)
	15 to 19 years	80 (10.0)
	20+ years	241 (30.1)
	Missing	57
Years in Department Categories	0 to 4 years	299 (37.1)
	5 to 9 years	211 (26.2)
	10 to 14 years	135 (16.8)
	15 to 19 years	54 (6.7)
	20+ years	106 (13.2)
	Missing	53
Board Certified	Yes	807 (98.2)
	No	15 (1.8)
	Missing	36
Gender	Male	544 (66.8)
	Female	270 (33.2)
	Missing	44
Race (aggregated URiM)	White	508 (64.4)
	Asian	212 (26.9)
	URiM	59 (7.5)
	Other and multi-racial	10 (1.3)
	Missing	69

Variable	Level	N (%) = 858
Race (disaggregated)	American Indian, Alaskan Native, Native Hawaiian or Other Pacific Islander	5 (0.6)
	Asian	212 (26.9)
	Black or African American	40 (5.1)
	Hispanic, Latino or Spanish origin	14 (1.8)
	Middle Eastern or North African	31 (3.9)
	White excluding Middle Eastern or North African	477 (60.5)
	Other	10 (1.3)
	Missing	69

Variable	Level	N (%) = 858
Race (disaggregated) by Academic Rank	Instructor or Assistant professor	371 (45.2)
	American Indian, Alaskan Native, Native Hawaiian or Other Pacific Islander	3 (0.8)
	Asian	96 (25.9)
	Black or African American	17 (4.6)
	Hispanic, Latino or Spanish origin	5 (1.4)
	Middle Eastern or North African	16 (4.3)
	White excluding Middle Eastern or North African	196 (52.8)
	Other	5 (1.4)
	Missing	33 (8.9)
	Associate Professor	258 (32.0)
	American Indian, Alaskan Native, Native Hawaiian or Other Pacific Islander	2 (0.8)
	Asian	68 (26)
	Black or African American	10 (3.8)
	Hispanic, Latino or Spanish origin	6 (2.3)
	Middle Eastern or North African	8 (3.1)
	White excluding Middle Eastern or North African	143 (54.6)
	Other	4 (1.5)

Variable	Level	N (%) = 858
	Missing	21 (8)
	Professor	187 (22.8)
	American Indian, Alaskan Native, Native Hawaiian or Other Pacific Islander	0 (0)
	Asian	40 (21.4)
	Black or African American	10 (5.4)
	Hispanic, Latino or Spanish origin	3 (1.6)
	Middle Eastern or North African	4 (2.1)
	White excluding Middle Eastern or North African	116 (62)
	Other	1 (0.5)
	Missing	13 (7)
Site/Primary Location	Main Campus	593 (69.4)
	Satellite Campus	261 (30.6)
	Missing	4
Tenure Track	Yes	288 (37.0)
	No	490 (63.0)
	Missing	80

Variable	Level	N (%) = 858
Formal Education Level	MD, DO with a PhD	175 (22.0)
	MD, DO with a Master's Degree	56 (7.0)
	MD, DO	562 (70.6)
	Other	3 (0.4)
	Missing	62

Table 2. Multivariable Logistic Regression Analysis (Factors Associated with Associate or Full Professor Rank for Academic Radiation Oncologists)

Effects	OR	Lower Limit of 95% C.I.	Upper Limit of 95% C.I.	p-value
Gender: Female vs Male	0.86	0.56	1.32	0.4844
Race/ethnicity				0.5107
Asian vs White	0.81	0.50	1.30	0.3740
URiM vs White	0.69	0.31	1.55	0.3690
Geographical region				**0.0004**
Midwestern Region vs Western Region	0.27	0.14	0.52	**<.0001**
Northeastern Region vs Western Region	0.51	0.27	0.96	**0.0368**
Southern Region vs Western Region	0.74	0.42	1.33	0.3170
Departmental size: more than 50 faculty members?: No vs Yes	0.60	0.38	0.93	**0.0237**
Site/practice location: Main Campus vs Satellite Campus	2.36	1.50	3.70	**0.0002**
Years of experience				**<.0001**
0 to 4 years vs 5 to 9 years	0.12	0.05	0.29	**<.0001**
10 to 14 years vs 5 to 9 years	2.95	1.57	5.53	**0.0008**
15 to 19 years vs 5 to 9 years	4.33	1.89	9.93	**0.0005**
20+ years vs 5 to 9 years	4.38	2.24	8.58	**<.0001**
Years in department				**<.0001**
0 to 4 years vs 5 to 9 years	0.41	0.23	0.71	**0.0015**
10 to 14 years vs 5 to 9 years	1.45	0.73	2.85	0.2879
15 to 19 years vs 5 to 9 years	2.67	0.87	8.18	0.0850
20+ years vs 5 to 9 years	5.00	1.66	15.02	**0.0041**

Note: This is the final model. Since race/ethnicity and gender are the variable of interest, they are retained in the final model regardless of statistical significance. We have explored the first order interaction terms of all other covariates with gender and race/ethnicity. None of the first-order interaction terms are significant. Only significant covariates are included in the final model.

Parameter	Estimate	95% CI	P-value
Gender (Female vs Male)	-0.017	(-0.068 ; 0.034)	0.5115
Race/ethnicity (ref: White)			0.7238
Asian	-0.016	(-0.073 ; 0.04)	0.5675
URiM	-0.03	(-0.121 ; 0.06)	0.5124
Geographic region (ref: Western Region)			0.0818
Midwestern Region	-0.083	(-0.162 ; -0.003)	0.0409
Northeastern Region	-0.02	(-0.101 ; 0.061)	0.6289
Southern Region	0.001	(-0.075 ; 0.077)	0.9804
Institutional funding (Private vs Public)	0.071	(0.014 ; 0.129)	0.0149
Departmental size; fifty or more faculty (No vs Yes)	-0.061	(-0.113 ; -0.008)	0.0229
Full-time classification (No vs Yes)	-0.598	(-0.699 ; -0.497)	<.0001
Site/primary location of practice (Main vs Satellite)	0.072	(0.018 ; 0.127)	0.0093
Tenure track (No vs Yes)	-0.083	(-0.139 ; -0.027)	0.0039
Physician scientist classification (No vs Yes)	-0.013	(-0.083 ; 0.057)	0.7141
Years of experience (ref= 5-9 years)			<0.0001
0 to 4 years	-0.008	(-0.097 ; 0.081)	0.8522
10 to 14 years	0.129	(0.043 ; 0.215)	0.0033
15 to 19 years	0.113	(0.002 ; 0.223)	0.0453
20+ years	0.28	(0.191 ; 0.368)	<.0001
Years in the department (ref= 5-9 years)			0.0019
0 to 4 years	-0.139	(-0.216 ; -0.062)	0.0004
10 to 14 years	-0.007	(-0.096 ; 0.082)	0.8793
15 to 19 years	0.043	(-0.077 ; 0.163)	0.4815
20+ years	-0.012	(-0.115 ; 0.09)	0.8117
Board certification status (No vs Yes)	-0.26	(-0.442 ; -0.078)	0.0052

Formal education level (ref= MD, DO with a PhD)			0.0124
MD, DO	0.093	(0.032 ; 0.155)	0.0031
MD, DO with a Master's Degree	0.059	(-0.044 ; 0.163)	0.2603

Table 3. Multivariable linear regression analysis modeling log relative total compensation as outcome variable, gender and grouped race/ethnicity (excluding academic rank as variable)

є t2ʎyű ŝăűʎYlˑűŝă űʎYŝă млл lˑLJLJ№2ЁʎYlˑűŝă űKŝ^ː ŘʎŦŦŝ№ŝyŏŝ ʎyˇű2űlˑt ŏ2YˇLJŝyãlˑűʎ2y¢
For example, radiation oncologists at the main campus earn ~7.2% more than those at a satellite location.

Parameter	Estimate	95% CI	P-value
Gender (Female vs Male)	-0.000	(-0.05 ; 0.047)	0.938
Race/ethnicity (ref: White)			0.5313
Asian	-0.030	(-0.083 ; 0.024)	0.276
URiM	-0.020	(-0.106 ; 0.065)	0.641
Geographic region (ref: Western Region)			0.4637
Midwestern Region	-0.050	(-0.125 ; 0.026)	0.199
Northeastern Region	-0.000	(-0.079 ; 0.074)	0.947
Southern Region	-0.010	(-0.076 ; 0.066)	0.883
Institutional funding (Private vs Public)	0.048	(-0.007 ; 0.102)	0.087
Departmental size; fifty or more faculty (No vs Yes)	-0.060	(-0.112 ; -0.011)	0.018
Full-time classification (No vs Yes)	-0.570	(-0.661 ; -0.471)	<.0001
Site/primary location of practice (Main vs Satellite)	0.029	(-0.024 ; 0.081)	0.289
Tenure track (No vs Yes)	-0.060	(-0.114 ; -0.008)	0.024
Physician scientist classification (No vs Yes)	0.016	(-0.05 ; 0.083)	0.635
Years of experience (ref= 5-9 years)			0.0257
0 to 4 years	0.042	(-0.044 ; 0.128)	0.337
10 to 14 years	0.095	(0.013 ; 0.177)	0.023
15 to 19 years	0.046	(-0.059 ; 0.152)	0.39
20+ years	0.140	(0.048 ; 0.233)	0.003
Years in the department (ref= 5-9 years)			0.0043
0 to 4 years	-0.130	(-0.206 ; -0.059)	<.0001
10 to 14 years	-0.030	(-0.111 ; 0.057)	0.529
15 to 19 years	-0.000	(-0.118 ; 0.112)	0.96
20+ years	-0.100	(-0.196 ; 0.006)	0.066
Board certification status (No vs Yes)	-0.090	(-0.276 ; 0.092)	0.327
Formal education level (ref= MD, DO with a PhD)			0.0315
MD, DO	0.076	(0.017 ; 0.135)	0.011

MD, DO with a Master's Degree	0.025	(-0.072 ; 0.123)	0.61
Academic rank (ref: Professor)			<.0001
Assistant Professor	-0.320	(-0.405 ; -0.23)	<.0001
Associate Professor	-0.200	(-0.276 ; -0.118)	<.0001
Instructor	-0.570	(-0.794 ; -0.338)	<.0001

Table 4.

Multivariable linear regression analysis modeling log relative total compensation as outcome variable, gender and grouped race/ethnicity (including academic rank as variable)

є t2ƛyű Ŝăűƛϒ l·űŜă űƛϒŜă млл approximates the % difference in total compensation. For example, radiation oncologists at the main campus earn ~2.9% more than those at a satellite location.

Parameter	Estimate[ϵ]	95% CI	P-value
Gender (Female vs male)	-0.018	(-0.069 ; 0.034)	0.4977
Race/ethnicity (ref: White excluding Middle Eastern or North African)			0.9878
American Indian, Alaskan Native, Native Hawaiian or Other Pacific Islander	0.01	(-0.256 ; 0.277)	0.9396
Asian	-0.015	(-0.072 ; 0.041)	0.594
Black or African American	-0.033	(-0.148 ; 0.081)	0.5669
Hispanic, Latino or Spanish origin	-0.035	(-0.202 ; 0.132)	0.6787
Middle Eastern or North African	0.021	(-0.111 ; 0.153)	0.7542
Other	-0.048	(-0.315 ; 0.22)	0.7263
Geographical Region (ref: Western Region)			0.0745
Midwestern Region	-0.083	(-0.162 ; -0.004)	0.04
Northeastern Region	-0.019	(-0.1 ; 0.062)	0.6424
Southern Region	0.003	(-0.073 ; 0.078)	0.9449
Institutional funding (Private vs Public)	0.072	(0.014 ; 0.129)	0.0146
Departmental size; fifty or more faculty (No vs Yes)	-0.06	(-0.113 ; -0.008)	0.0242
Full-time classification (No vs Yes)	-0.598	(-0.7 ; -0.497)	<.0001
Site/primary location of practice (Main vs Satellite)	0.072	(0.018 ; 0.127)	0.0093
Tenure track (No vs Yes)	-0.079	(-0.135 ; -0.024)	0.0051
Physician scientist classification (No vs Yes)	-0.015	(-0.085 ; 0.056)	0.6833
Years of experience (ref= 5-9 years)			<.0001
0 to 4 years	-0.009	(-0.097 ; 0.079)	0.8413
10 to 14 years	0.127	(0.041 ; 0.213)	0.0037
15 to 19 years	0.111	(0 ; 0.221)	0.0491
20+ years	0.28	(0.191 ; 0.368)	<.0001
Years in the department (ref= 5-9 years)			0.0021
0 to 4 years	-0.137	(-0.215 ; -0.059)	0.0006

10 to 14 years	-0.004	(-0.094 ; 0.085)	0.922
15 to 19 years	0.046	(-0.074 ; 0.166)	0.4499
20+ years	-0.007	(-0.11 ; 0.095)	0.8913
Board certification status (No vs Yes)	-0.247	(-0.422 ; -0.072)	0.0058
Formal education level (ref= MD, DO with a PhD)			0.0058
MD, DO	0.092	(0.03 ; 0.153)	0.0037
MD, DO with a Master's Degree	0.059	(-0.043 ; 0.161)	0.2583

Table 5A. Multivariable linear regression analysis modeling log relative total compensation as outcome variable, gender and ungrouped race/ethnicity (excluding academic rank as variable)

є tƻʎƴǘ ŜǎǘʎΥ Ɩ·ǘŜǎ ǘʎΥŜǎ млл approximates the % difference in total compensation. For example, radiation oncologists at the main campus earn ~7.2% more than those at a satellite location.

Table 5B. Multivariable linear regression analysis modeling log relative total compensation as outcome variable, gender and ungrouped race/ethnicity (including academic rank as variable)

Parameter	Estimate[€]	95% CI	P-value
Gender (Female vs male)	-0.003	(-0.051 ; 0.046)	0.9166
Race/ethnicity (ref: White excluding Middle Eastern or North African)			0.9165
American Indian, Alaskan Native, Native Hawaiian or Other Pacific Islander	0.037	(-0.213 ; 0.287)	0.771
Asian	-0.027	(-0.081 ; 0.026)	0.3185
Black or African American	-0.024	(-0.131 ; 0.083)	0.6635
Hispanic, Latino or Spanish origin	-0.026	(-0.182 ; 0.131)	0.7475
Middle Eastern or North African	0.046	(-0.079 ; 0.17)	0.4719
Other	-0.030	(-0.281 ; 0.221)	0.8154
Geographical Region (ref: Western Region)			0.4367
Midwestern Region	-0.050	(-0.125 ; 0.025)	0.1944
Northeastern Region	-0.002	(-0.079 ; 0.075)	0.9618
Southern Region	-0.003	(-0.074 ; 0.068)	0.9291
Institutional funding (Private vs Public)	0.048	(-0.006 ; 0.103)	0.0818
Departmental size; fifty or more faculty (No vs Yes)	-0.062	(-0.112 ; -0.011)	0.017
Full-time classification (No vs Yes)	-0.565	(-0.66 ; -0.47)	<.0001
Site/primary location of practice (Main vs Satellite)	0.029	(-0.024 ; 0.082)	0.2824
Tenure track (No vs Yes)	-0.060	(-0.113 ; -0.008)	0.0247
Physician scientist classification (No vs Yes)	0.015	(-0.052 ; 0.082)	0.6587
Years of experience (ref= 5-9 years)			0.0237
0 to 4 years	0.042	(-0.043 ; 0.128)	0.3296
10 to 14 years	0.095	(0.014 ; 0.177)	0.0227
15 to 19 years	0.043	(-0.063 ; 0.148)	0.4267

Parameter	Estimate[ϵ]	95% CI	P-value
20+ years	0.140	(0.048 ; 0.233)	0.003
Years in the department (ref= 5-9 years)			0.0054
0 to 4 years	-0.130	(-0.204 ; -0.056)	0.0006
10 to 14 years	-0.026	(-0.11 ; 0.058)	0.5478
15 to 19 years	-0.001	(-0.116 ; 0.115)	0.9921
20+ years	-0.092	(-0.193 ; 0.009)	0.074
Board certification status (No vs Yes)	-0.095	(-0.27 ; 0.081)	0.2904
Formal education level (ref= MD, DO with a PhD)			0. 0305
MD, DO	0.075	(0.017 ; 0.134)	0.0121
MD, DO with a Master's Degree	0.021	(-0.076 ; 0.117)	0.678
Academic Ranking (ref: Professor)			<.0001
Assistant Professor	-0.319	(-0.406 ; -0.232)	<.0001
Associate Professor	-0.197	(-0.276 ; -0.118)	<.0001
Instructor	-0.577	(-0.806 ; -0.348)	<.0001

ϵ t2ʎyű Ŝăűʎϒ l·űŜă űʎϒŜă млл l·ǈǈǋ2Ȅʎϒ l·űŜă űKŜ̥̂ Řʎ₮₮ŜǋŜyŎŜ ʎɣ total compensation. For example, radiation oncologists at the main campus earn ~2.9% more than those at a satellite location.

Declaration of interests

☐The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☒The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Ann Raldow reports a relationship with ViewRay Inc that includes: consulting or advisory and funding grants. Ann Raldow reports a relationship with Intelligent Automation Inc that includes: funding grants.