BMJ Open

Gender-based salary differences in academic medicine: a retrospective review of data from six public medical centers in the Western USA

Hayley Miller ,[1] Elizabeth Seckel,[2] Chrislyn L White,[3] Diana Sanchez,[4] Erika Rubesova,[5] Claudia Mueller,[6] Katherine Bianco[1]

To cite: Miller H, Seckel E, White CL, *et al*. Gender-based salary differences in academic medicine: a retrospective review of data from six public medical centers in the Western USA. *BMJ Open* 2022;**12**:e059216. doi:10.1136/bmjopen-2021-059216

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2021-059216).

CM and KB are joint senior authors.

Received 23 November 2021
Accepted 14 March 2022

For numbered affiliations see end of article.

Correspondence to
Dr Hayley Miller;
hayleym@stanford.edu

ABSTRACT

Objectives We assessed the effect of gender, rank and research productivity on compensation for faculty at academic medical centres.

Design A web-based retrospective review of salary for professors in 2016.

Setting Faculty from six state-run, publicly funded academic medical centres in the Western USA.

Participants 799 faculty members, 225 assistant (51% women), 200 associate (40% women) and 374 full professors (32% women) from general surgery (26% women), obstetrics and gynaecology (70% women) and radiology (34% women).

Methods Archived online faculty profiles were reviewed for gender, rank and compensation (total, baseline and supplemental). Total compensation was defined as baseline compensation plus supplemental income. Baseline compensation was defined as base salary minus reductions due to participation in the voluntary Employee Reduction in Time and phased retirement programmes. Supplemental income was defined as additional salary for clinical care and research (eg, grants). Elsevier's Scopus was used to collect data on h-index, a measure of research productivity. Linear regression models were estimated to determine the relationship between these factors and salary.

Results Total compensation was significantly higher for men across all professorial ranks in both general surgery ($R^2 = 0.159$, $F(4, 299) = 14.123$, $p < 0.01$) and obstetrics and gynaecology ($R^2 = 0.068$, $F(4, 174) = 3.172$, $p < 0.05$). Women faculty members within these departments earned almost US$75 000 less than their men colleagues. The disparity in salary originates from gaps in supplemental income, as baseline compensation was not significantly different between men and women. No significant gender difference in total compensation for radiology was found ($R^2 = 0.01$, $F(4, 266) = 0.591$, n.s.). Higher h-index was associated with higher baseline compensation across all departments as well as with supplemental income for general surgery. Higher h-index was related to lower supplemental income for radiology and was not related to supplemental income for obstetrics and gynaecology.

Conclusions Further investigations should focus on discrepancies in supplemental income, which may preferentially benefit men.

Strengths and limitations of this study

- This is a large population study assessing distribution of salary among three diverse disciplines based on their gender distributions and distribution of the types of clinical work.
- Linear regression models were estimated to determine the relationship among specialty, gender, rank, h-index and salary.
- We focus on only one set of state-based academic institutions from the west coast of the USA and so are unable to be certain whether our findings would generalise to private practices or to those in other parts of the country.
- We examined salaries from only three departments, and therefore cannot be certain that other clinical specialties would follow similar patterns.
- As the data were obtained from websites, we were unable to delve more deeply into the components of supplemental income beyond the general description that was offered publicly.

INTRODUCTION

The more education a woman has, the greater the gender disparity in salary is seen.[1] This disparity is especially glaring for physicians and surgeons, with women earning about 74 cents for every dollar men earn.[2] Representation of women in medicine is increasing dramatically; however, the gender salary gap remains.[3 4] Women faculty members have been shown to have lower salaries, smaller start-up packages and limited authorship roles.[3–13] Despite the Equal Pay Act of 1963, this gap continues to exist across specialties, practice settings, work hours and other characteristics,[6–10] and persists even after accounting for age, experience, specialty, faculty rank and measures of research productivity and clinical revenue.[6–13] Commonly cited explanations for this gender disparity in salary include differences in negotiating skills,

opportunities to join networks of influence within organisations, discrimination, and implicit and explicit bias.[6 7 10 14–16]

There is an increasingly large body of evidence that gender not only impacts salary, but also faculty rank and research productivity.[6–13] Gender disparities in faculty rank within academic medicine persist after accounting for age, years since completion of residency, specialty, scientific authorship, National Institutes of Health (NIH) research funding, clinical trial participation and clinical revenue.[10] In academic medicine specifically, there is a significant gender difference in number and impact of publications, with women showing lower productivity than men in surgical specialties.[13]

In order to close the salary gap in academic medicine, we must be clear where in total compensation packages this disparity originates. Previous data as they relate to non-medical occupations suggest that gender differences in salary can be attributed to the salary gaps within specific occupations, not across occupations.[17] As such, we chose to focus this study on academic salary at a single timepoint, expecting to see differences in salary based on gender, faculty rank and h-index, a metric for evaluating the cumulative impact of an author's scholarly output and performance calculated by comparing number of publications to citations.[18] The primary objective of our study was to identify where in total compensation the salary gap originates by evaluating differences in salary based on gender, rank and research productivity for three diverse academic medical specialties. Our areas of interest—salary, academic rank and research productivity—are typical benchmarks for professional development.[6–11 18 19] We hypothesised that women would earn significantly less total compensation across all ranks, even after accounting for rank and research productivity.

METHODS

Study design

This was a retrospective population study of total faculty compensation for assistant, associate and full professors at six major public academic medical centres using a single timepoint during 2016. We chose the timepoint of 2016 as it was the most recent year for which data were available at the time. Three diverse specialties—general surgery, obstetrics and gynaecology, and radiology—were chosen, primarily because of their gender distributions and distribution of the types of clinical work.[8 20–25] General surgery and radiology are male-dominated specialties, while obstetrics and gynaecology is a female-dominated specialty.[20–25] There is also a diversity of clinical work throughout these three subspecialities with general surgery being dominated by surgical procedures, radiology not being surgical in nature, and obstetrics and gynaecology with a more diverse balance of clinical work.[3 8 20–26]

Study population

Archived online faculty profiles were reviewed to collect information on gender. Trained research staff used the internet archive service Wayback Machine[26] to collect data on gender from 2016 online faculty profiles at each department's website. Gender was identified on faculty profiles by identifying the pronoun included on faculty profiles. In the occasion that the pronoun was not specifically stated, the research staff used faculty photo and name to identify gender. Faculty members from six academic institutions were included. We were able to stratify by assistant, associate or full professor faculty rank.

Total compensation, rank and research productivity

A publicly available database that contains all the compensation information for faculty members and employees at a large university system was used to look at total faculty compensation in three different ways: total compensation, baseline compensation and supplemental income.[27] Total compensation was defined as baseline compensation plus supplemental income. Baseline compensation was defined as base salary minus reductions due to participation in the voluntary Employee Reduction in Time and phased retirement programmes. Supplemental income (commonly referred to as 'discretionary pay') was defined as negotiated additional salary for clinical care and research that was funded from earned clinical revenue as well as contracts and grants. This includes: pay for summer session or University extension teaching, pay for research performed during summer months that is funded by extramural contracts and grants, performance-based incentive compensation and similar payments that recognise achievement of specific performance goals or exemplary service, pay for shift differentials (eg, night or holiday call), payout of unused vacation leave on separation and lump sum payments made as part of the settlement of union bargaining agreements. Data on academic rank and specialty were collected from the same database. Elsevier's Scopus was used to collect data on h-index. Faculty members' h-indices were obtained using their full name, last name and first and middle initials, and/or maiden name when appropriate (online supplemental table 1).

Statistical analysis

Our dataset consisted of six variables: (1) department—a three-level categorical variable (surgery, obstetrics and gynaecology, and radiology); (2) rank—three-level categorical variables (assistant, associate and full); (3) gender; (4) h-index—a measure of publication output; (5) baseline compensation—ie, salary; and (6) supplemental income—eg, bonuses, income for extra work. Linear regression models were estimated to determine the relationship between these factors and salary. Compensation was selected as our primary variable and gender, academic rank, and h-index as secondary variables. Rank, gender and h-index were treated as independent variables, whereas 'baseline compensation' and

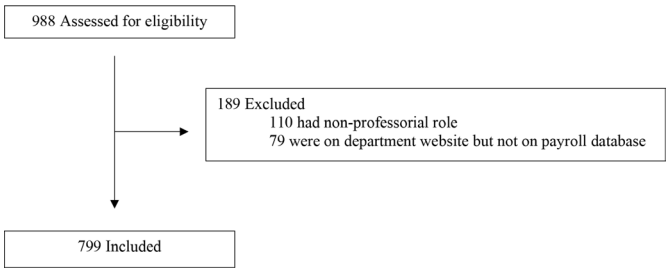

Figure 1 Participant exclusions. Participants included 799 faculty members. Total 988 institution employees were assessed for eligibility. Overall, 189 were excluded for having a non-professorial, full-time role. A further 79 were excluded for only being listed on the department website, not being on 2016 payroll.

'supplemental income' were treated as dependent variables. Because rank is a three-level categorical level, it was split into two dummy variables with 'full' as reference value. Three regression models were run per department: one to predict total compensation (baseline compensation plus supplemental income), one to predict baseline compensation, and one to predict supplemental income. Data were entered into SPSS V.20, with a p value <0.05 considered to be significant.

Patient and public involvement

There was no patient or public involvement.

RESULTS

Total 988 employees were assessed for eligibility (see figure 1). Overall, 110 (11%) were excluded for having a role other than assistant, associate or full professor. A further 79 (8%) were excluded because they were listed on the department website but not in the payroll database. After exclusions, our analysis included 799 faculty members, 312 (39%) were identified as women and 487 (61%) were identified as men and distribution among

Table 1 Demographic data for women and men faculty members by institution and department at six academic institutions in 2016

			Assistant		Associate		Professor	
Institution	**Department**	**Total**	**W***	**M†**	**W**	**M**	**W**	**M**
Institution 1		121						
	Surgery	52	6	9	1	12	5	19
	Obstetrics/gynaecology	26	10	1	4	2	5	4
	Radiology	43	5	8	3	3	6	18
Institution 2		77						
	Surgery	32	5	3	4	7	0	13
	Obstetrics/gynaecology	22	4	1	8	1	4	4
	Radiology	23	0	3	2	7	5	6
Institution 3		175						
	Surgery	70	5	7	4	18	4	32
	Obstetrics/gynaecology	40	17	3	4	3	5	8
	Radiology	65	9	16	4	12	9	15
Institution 4‡		15						
	Surgery	0	0	0	0	0	0	0
	Obstetrics/gynaecology	15	9	1	2	0	2	1
	Radiology	0	0	0	0	0	0	0
Institution 5		168						
	Surgery	72	5	12	7	14	8	26
	Obstetrics/gynaecology	27	3	0	4	0	8	12
	Radiology	69	2	9	8	7	9	34
Institution 6		243						
	Surgery	79	5	12	10	13	11	28
	Obstetrics/gynaecology	50	15	3	5	3	17	7
	Radiology	114	15	22	9	19	20	29

*Women.
†Men.
‡Institution 4 did not have a surgery or radiology department.

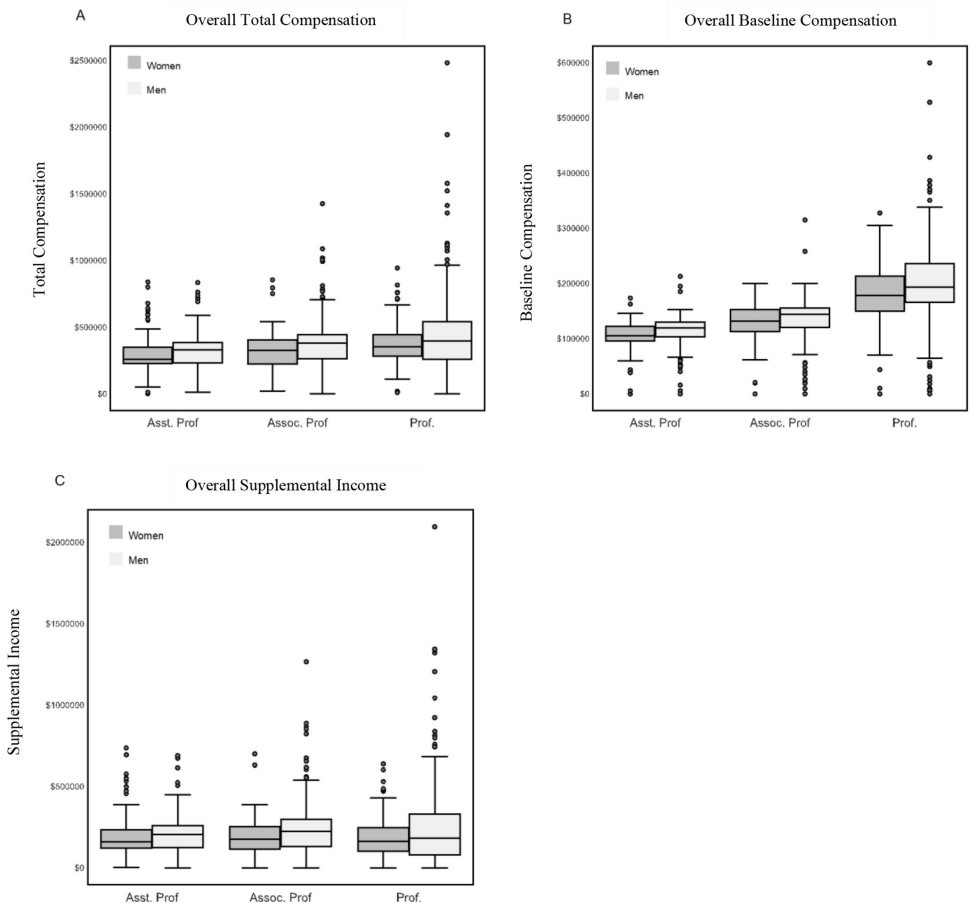

Figure 2 Overall salary. Distribution of total compensation (A), baseline compensation (B) and supplemental income (C) of women and men in general surgery, obstetrics and gynaecology, and radiology departments stratified by academic rank.

ranks included 225 (28%) assistant, 200 (25%) associate and 374 (47%) full professors (table 1).

Overall, women represented 26% of general surgery faculty (n=126), 70% of obstetrics and gynaecology faculty (n=106) and 34% of radiology faculty (n=80). Among ranks, women made up 51% of all assistant professors (n=115) and men made up 49% (n=110), women made up 40% of associate professors (n=79) and men made up 60% (n=121), and women made up 32% of full professors (n=118) while men made up 68% (n=256) (table 1). Distribution of stratified by gender and academic rank is presented in figure 2 and table 2.

General surgery

Distribution of salary for general surgery is presented in figure 3. Within general surgery, the overall regression for total compensation was significant ($R^2 = 0.159$, $F(4, 299) = 14.123$, $p < 0.01$). This means that, when they are examined together, the independent variables of gender, rank and h-index influence the dependent variable of total compensation. Looking specifically at the three independent variables, we found that: gender was significantly different with women earning lower total compensation than men ($\beta = -84,970$, $p < 0.05$). Rank was not significantly different for total compensation. Higher h-index was significantly associated with higher total compensation ($\beta = 5,023$, $p < 0.01$).

In an attempt to analyse what specifically drove the effect on total compensation, we ran separate analyses on 'baseline compensation' and 'supplemental income.' In terms of baseline compensation, the overall regression was significant ($R^2 = 0.323$, $F(4, 299) = 35.737$, $p < 0.01$). Again, these analyses took into account the combined effect of all three independent variables of gender, rank and h-index on baseline compensation. Looking specifically at each variable within the regression: gender was not significantly associated with baseline compensation with men and women receiving similar baseline compensation. Rank was associated with regular salary, with assistant professors ($\beta = -51,031$, $p < 0.01$) and associate professors ($\beta = -40,680$, $p < 0.01$) earning significantly less baseline compensation than full professors. Higher h-index was also significantly associated with higher baseline compensation ($\beta = 1,606$, $p < 0.01$).

For supplemental income, the overall regression was significant, again examining the combined effect of gender, rank and h-index, was significant ($R^2 = 0.096$, $F(4,299) = 7.900$, $p < 0.01$). In terms of specific variables: gender was significantly associated with supplemental income ($\beta = -79,467$, $p < 0.05$) with women

Table 2 Average total compensation, baseline compensation and supplemental income stratified by department, rank and gender at six academic institutions in 2016

Department	Rank	Gender	Total	Total compensation (mean±SD)*	Baseline compensation (mean±SD)*	Supplemental income (mean±SD*)
General surgery	Assistant	W†	58	325±167	100±21	225±165
		M‡	9	401±212	103±10	299±215
	Associate	W	27	322±138	127±28	195±129
		M	9	463±209	118±8	345±211
	Professor	W	41	356±135	161±40	195±115
		M	36	431±266	194±70	238±235
Obstetrics/gynaecology	Assistant	W	31	273±117	106±28	166±98
		M	58	306±108	111±27	195±89
	Associate	W	26	306±118	128±28	178±98
		M	48	318±138	128±35	190±114
	Professor	W	49	349±122	189±61	160±90
		M	102	331±155	191±66	140±122
Radiology	Assistant	W	26	271±102	116±32	155±79
		M	43	318±181	116±45	201±149
	Associate	W	26	334±193	130±47	204±168
		M	64	440±272	142±54	297±251
	Professor	W	28	433±221	196±65	237±185
		M	118	552±366	208±88	344±320

*Compensation data presented as thousands.
†Women.
‡Men.

earning significantly less of this salary component than men. There was no difference for rank on supplemental income. Higher h-index was significantly associated with supplemental income ($\beta = 3,418,\ p < 0.01$).

Obstetrics and gynecology

Distribution of salary for obstetrics and gynaecology is presented in figure 4. For obstetrics and gynaecology, the overall regression, which included the variables of gender, rank and h-index, for total compensation was significant ($R^2 = 0.068,\ F(4,\ 174) = 3.172,\ p < 0.05$). Looking at each variable specifically, there was a significant difference in gender, with women earning less total compensation than men ($\beta = -84,221,\ p < 0.02$). Rank was not found to be significantly different for total compensation for either assistant or associate professors compared with full professors. H-index was also not significantly associated with total compensation.

For baseline compensation, the overall regression of the combined effect of gender, rank and h-index was significant ($R^2 = 0.485,\ F(4,\ 174) = 40.986,\ p < 0.01$). For the specific variables: there was no significant difference between women and men in baseline compensation. Rank was associated with baseline compensation, with both assistant ($\beta = -52,696,\ p < 0.01$) and associate professors ($\beta = -36,711,\ p < 0.01$) earning significantly less than full professors. H-index was also significant ($\beta = 1,314,\ p < 0.01$), with higher h-index linked to higher baseline compensation.

For supplemental income, the overall regression of the combined effect of gender, rank and h-index was not significant ($R^2 = 0.037,\ F(4,\ 174) = 1.666$, n.s.). However, when we looked at the three variables specifically within the regression, there was a significant difference in gender, with women earning less supplemental income than men ($\beta = -74,168,\ p < 0.05$). There were no significant differences in supplemental income for the variables of rank or h-index.

Radiology

Distribution of salary for radiology is presented in figure 5. Within radiology, the overall regression, which again examined the combined effect of gender, rank and h-index, for total compensation was not significant ($R^2 = 0.01,\ F(4,266) = 0.591$, n.s.). Furthermore, none of the individual variables of gender, rank or h-index showed any significant association with total compensation.

In terms of baseline compensation, the overall regression, which again included the combined effect of gender, rank and h-index, was significant ($R^2 = 0.395,\ F(4,265) = 43.293,\ p < 0.01$). For the specific variables: gender was not significantly associated with

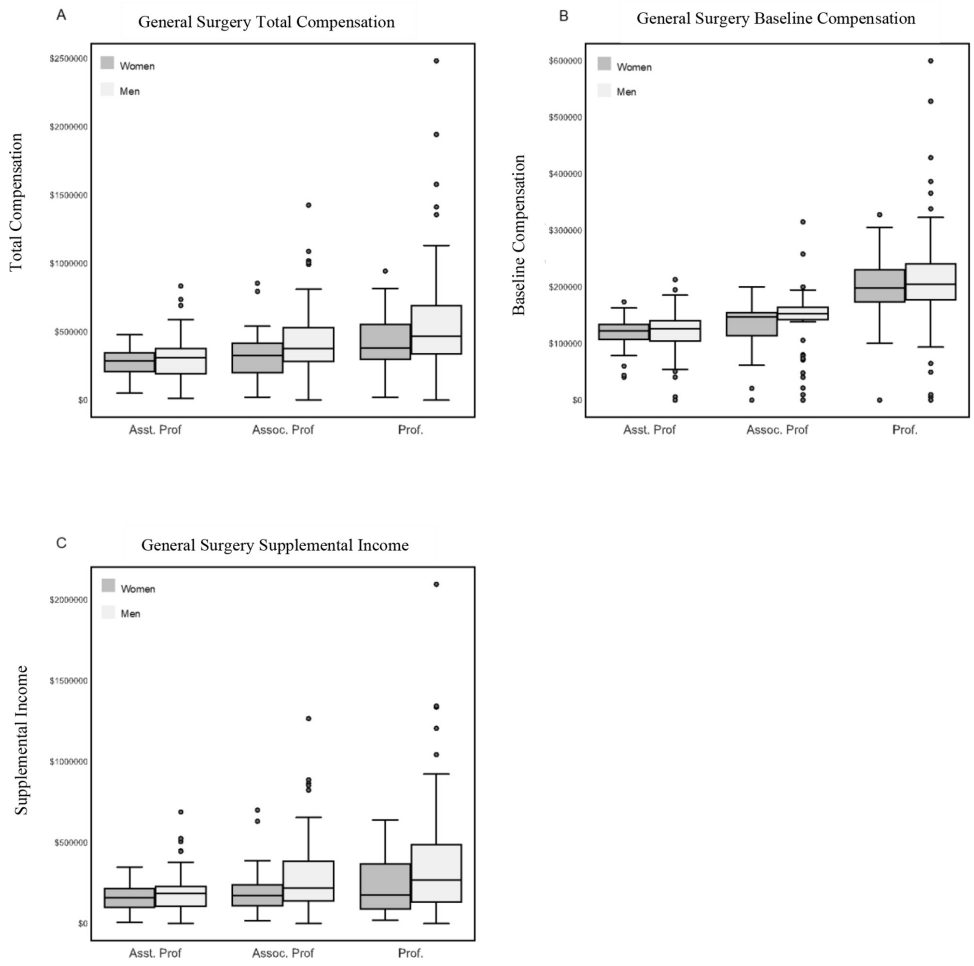

Figure 3 General surgery salary. Distribution of total compensation (A), baseline compensation (B) and supplemental income (C) of women and men in general surgery stratified by academic rank.

baseline compensation as men and women earned similar base compensation. Significant differences in baseline compensation by rank were identified with assistant professors ($\beta = -52,145,\ p < 0.01$) and associate professors ($\beta = -43,848,\ p < 0.01$) earning significantly lower baseline compensation than full professors. Higher h-index was also significantly associated with higher baseline compensation ($\beta = 979,\ p < 0.01$).

For supplemental income, the overall regression of the combined effect of gender, rank and h-index was significant ($R^2 = 0.064,\ F(4, 266) = 4.567,\ p < 0.01$). In terms of the specific variables, there was no significant association between gender and supplemental income. Rank also not associated with supplemental income. H-index was significantly associated with supplemental income ($\beta = -947,\ p < 0.05$). Higher h-index linked to lower supplemental income.

DISCUSSION

Our results show that while there are significant differences in total compensation for women faculty members in general surgery and obstetrics and gynaecology, it is not baseline compensation that accounts for the salary gap between women and men. Instead, other components of salary, classified in our data as supplemental income, appear to contribute to acknowledged differences in salary between women and men faculty members within our target institutions. In our review of publicly available salary data,[26 27] women faculty members within the departments of general surgery and obstetrics and gynaecology earned almost US$75 000 less than their men colleagues. This supplemental income is described as coming from additional clinical responsibilities such as call income as well as support for administrative work or leadership positions and was not consistently linked to academic productivity, as defined by h-index, across specialties in our study.[27] These findings echo the work of the economist Claudia Goldin who has described the gender salary gap in a variety of professions as being related not to differences in baseline compensation but rather to differences related to flexibility or amount of work that is taken on by women versus men.[27 28]

Previous studies offer many theories to explain the gender gap, including women, are less likely to be asked to serve as leaders, experience effective mentoring, receive equitable allocation of research funding, and

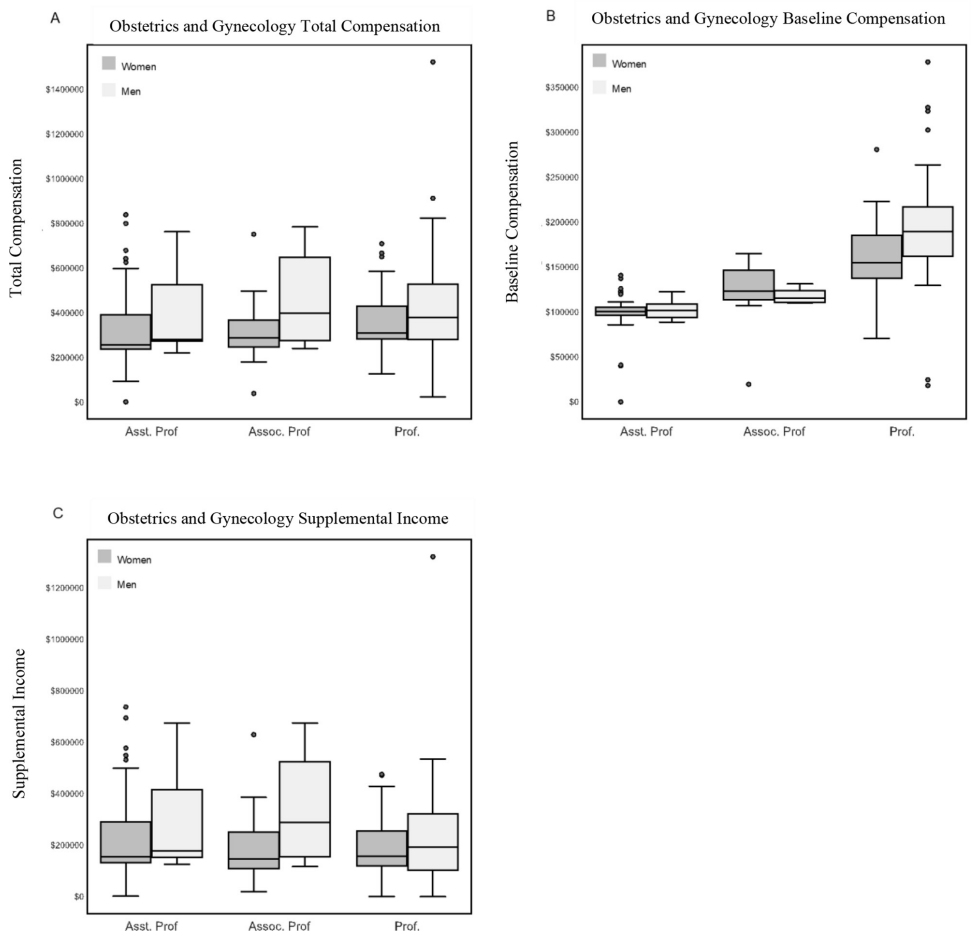

Figure 4 Obstetrics and gynaecology salary. Distribution of total compensation (A), baseline compensation (B) and supplemental income (C) of women and men in obstetrics and gynaecology stratified by academic rank.

seek additional call hours or clinical work in favour of different household and childrearing obligations.[3 29–35] Women faculty members who work flexible hours may be less likely than men to receive leadership positions that result in bonus salary.[29] In fact, faculty members who need a more flexible work schedule remain as junior faculty and receive less support.[30] These circumstances help to explain our findings the lower 'additional' or supplemental income for women faculty members within the two specialties. One solution is to alter promotion policies to better support the diversity of needs.[30] Additional solutions can be found in the NIH's Gender Inequality Task Force Report.[31]

Interestingly, the gender gap for supplemental income in our study was true within obstetrics and gynaecology, despite the fact that women comprise a majority of faculty members within this specialty. Furthermore, no gender gap was identified for the department of radiology, despite its male predominance. This finding suggests that the gender distribution of the department alone does not necessarily guide salary discrepancies between women and men faculty members. Instead, it seems that other factors, such as the nature of the clinical work itself, may contribute to the gender salary gap.[31] It has been acknowledged in previous studies that surgical subspecialties are highly technical and predominantly occupied by men, and often times men are among the highest paid with roles as researchers, opposed to women within these specialties occupying lower status communal roles as educators.[34] For instance, no gender differences were noted for any portion of salary within the radiology departments that we examined in this study. Radiology clinical work differs from that of other specialties in that it is predominantly shift based and less procedural than general surgery and obstetrics and gynaecology. Radiology may thereby offer fewer opportunities for gender-based increases to supplemental income that might be earned through additional clinical work.

Our findings also validate previous studies finding striking gender inequities in the higher academic ranks.[13] Common explanations for these gender differences include the gender-based hiring disparities of previous generations, lack of transparency of salary, promotion, mentoring and female role models, and time away for childbearing and family obligations.[14 15 29 30 33] There is also recent evidence that women physicians might start their career with lower salary expectations than men, which could become a self-fulfilling prophecy for later salary.[30 34] Furthermore, there is some indication that women prioritise salary less than men do and are judged more harshly for initiating negotiations.[6 14 15 30]

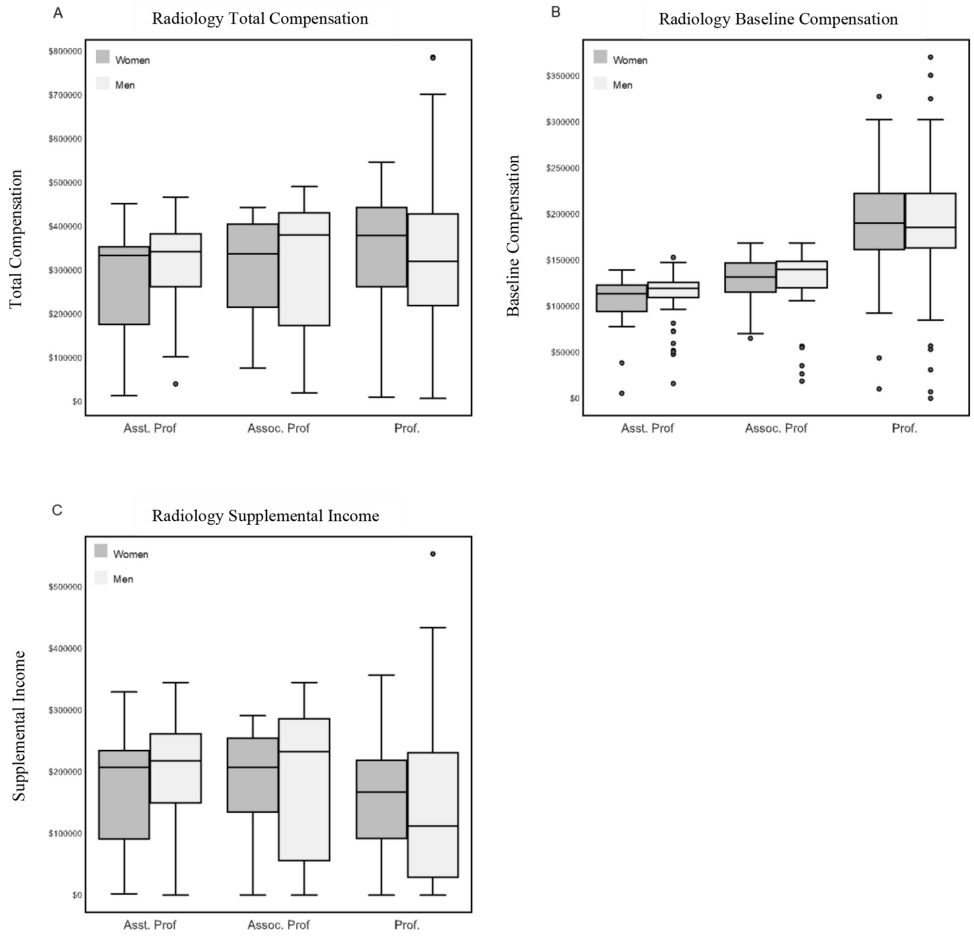

Figure 5 Radiology salary. Distribution of total compensation (A), baseline compensation (B) and supplemental income (C) of women and men in radiology stratified by academic rank.

In summary, gender disparities have been well documented in academic medicine, and our study offers a unique perspective of the different components that make up the academic medicine physician salary. Previous studies have offered suggestions to improve this disparity, which will be important for closing this supplemental income gap. Suggestions include transparency of starting salaries to young professionals, initiating negotiation training to improve starting salary packages, mentorship in career advancement for women junior faculty, investigation of research grant award processes and further adoption of programmes to address disparities in grant award processes.[31] Implementation of a university-wide objective compensation planned implemented by the Association of American Medical Colleges regional median salary was associated with reduced gender-based differences in salary among surgery faculty within the institution and a statistically significant increase in salary among female faculty members. Objective compensation plans may mitigate gender-based implicit bias in salary negotiations and promotions.[35]

Limitations

Our study has several limitations. First, we focus on only one set of state-based academic institutions from the west coast of the USA and so are unable to be certain whether our findings would generalise to private practices or to those in other parts of the country. Furthermore, we examined salaries from only three departments, and therefore cannot be certain that other clinical specialties would follow similar patterns. However, the departments were chosen to accurately reflect a set of departments with a diverse set of gender distribution and clinical work. Finally, since our data were obtained from websites only, we are unable to delve more deeply into the components of supplemental income salary beyond the general description that is offered publicly. For instance, we cannot determine how much is related to compensation for clinical or administrative work versus research funding. We are also not certain what types of research funding are included in this supplemental income and whether certain grants (eg, external) might be differently influenced by factors such as competitiveness of topic or number of proposals submitted. We are therefore not able to completely explain what aspect of compensation supplemental incomes represents or why it is not related to academic productivity in the same way across the three departments. Another limitation is that the 2016 data may not reflect more contemporary remuneration; however,

based on salary disparity trends, we do not anticipate the salary gap narrowing since the study period. Additionally, during the study period, gender pronouns were included in most faculty profiles; however, pronouns were not available on a limited number of faculty profiles. For faculty members who did not include gender pronouns, we were limited to faculty name and profile photo and a trained research staff member selected the assumed gender. Additionally, we did not have granular data to distinguish nonbinary and gender expansive people. We recognise that diversity and equity is of utmost importance in all underrepresented populations. Further research is warranted on the impact of other variables such as race, ethnicity and lesbian, gay, bisexual, transgender, queer, and questioning people.

CONCLUSION

In sum, our study observed the trends of salary within three clinical specialties at state-run, publicly funded academic institutions. For this sample, gender differences were most notable in the fields of general surgery and obstetrics and gynaecology. We suggest that further investigations should focus less on gender inequities of base salary, which may not be relevant to clinical faculty in academic settings as they are institutionally set to be independent of gender, and more on discrepancies in discretionary or supplemental income, which may preferentially benefit men. With closer analysis, we might be able to achieve a better understanding of whether women are not receiving their full earning potential or, as has been suggested in the economic literature,[28 36] whether they are instead prioritising flexibility in work hours over compensation. Finally, with our observation that the gender salary gap might not be as prominent within the field of radiology, additional studies of this specialty could identify ways in which it could serve as a model for gender-based salary structures for clinicians.

Author affiliations
[1]Department of Obstetrics and Gynecology, Stanford University, Palo Alto, California, USA
[2]Department of Medicine, Stanford University, Palo Alto, California, USA
[3]Obstetrics & Gynecology, Kaiser Permanente San Leandro Medical Center, San Leandro, California, USA
[4]University of Illinois College of Medicine at Chicago, Chicago, Illinois, USA
[5]Department of Radiology, Stanford University, Palo Alto, California, USA
[6]Department of Surgery, Stanford University, Palo Alto, California, USA

Acknowledgements We would like to thank the academic medical centers for providing this public information.

Contributors HM was a major contributor in the writing of the manuscript. ES analysed and interpreted the data and contributed to manuscript preparation. CLW performed data abstraction and collection. DS performed data abstraction and collection. ER edited the manuscript. CLM served as the guarantor of the study, she designed the study, analysed and interpreted the data and was a major contributor in writing of the manuscript. KB served as the guarantor of the study, she designed the study, analysed and interpreted the data and was a major contributor in writing of the manuscript. All authors read and approved the final manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval Ethics approval and consent to participate for this study were waived by the Institutional Review Board of the Stanford University School of Medicine, IRB-40645.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. H-index data are available within our online supplemental table. If any data are requested, the authors have all data available for review.

ORCID iD
Hayley Miller http://orcid.org/0000-0002-0929-8830

REFERENCES

1 Bureau USC. *American community survey*. Washington, DC: United States Census Bureau, US Department of Commerce, 2016.
2 Among the educated, women earn 74 cents for every dollar men make, 2020. Available: https://www.census.gov/library/stories/2019/05/college-degree-widens-gender-earnings-gap.html
3 Cater SW, Yoon SC, Lowell DA, *et al*. Bridging the gap: identifying global trends in gender disparity among the radiology physician workforce. *Acad Radiol* 2018;25:1052–61.
4 Freund KM, Raj A, Kaplan SE, *et al*. Inequities in academic compensation by gender: a follow-up to the National faculty survey cohort study. *Acad Med* 2016;91:1068.
5 Macaluso B, Larivière V, Sugimoto T, *et al*. Is science built on the shoulders of women? A study of gender differences in Contributorship. *Acad Med* 2016;91:1136–42.
6 Weaver AC, Wetterneck TB, Whelan CT, *et al*. A matter of priorities? exploring the persistent gender pay gap in hospital medicine. *J Hosp Med* 2015;10:486–90.
7 Lo Sasso AT, Richards MR, Chou C-F, *et al*. The $16,819 pay gap for newly trained physicians: the unexplained trend of men earning more than women. *Health Aff* 2011;30:193–201.
8 Hack L. ObGyn compensation: Strides in the gender wage gap indicate closure possible. *OBG Management* 2019;31.
9 Eloy JA, Svider PF, Cherla DV, *et al*. Gender disparities in research productivity among 9952 academic physicians. *Laryngoscope* 2013;123:1865–75.
10 Jena AB, Olenski AR, Blumenthal DM. Sex differences in physician salary in US public medical schools. *JAMA Intern Med* 2016;176:1294.
11 Seabury SA, Chandra A, Jena AB. Trends in the earnings of male and female health care professionals in the United States, 1987 to 2010. *JAMA Intern Med* 2013;173:1748–50.
12 Nonnemaker L. Women physicians in academic medicine: new insights from cohort studies. *N Engl J Med* 2000;342:399–405.
13 Mueller C, Wright R, Girod S. The publication gender gap in US academic surgery. *BMC Surg* 2017;17:16.
14 Sarfaty S, Kolb D, Barnett R, *et al*. Negotiation in academic medicine: a necessary career skill. *J Womens Health* 2007;16:235–44.
15 Stevens CK, Bavetta AG, Gist ME. Gender differences in the acquisition of salary negotiation skills: the role of goals, self-efficacy, and perceived control. *J Appl Psychol* 1993;78:723–35.

16 Rudman LA, Glick P. Prescriptive gender stereotypes and backlash toward agentic women. *J Soc Issues* 2001;57:743–62.
17 Goldin C. How to achieve gender equality. *Milken Institute Review Q* 2015;3:24–33.
18 Hirsch JE. An index to quantify an individual's scientific research output. *Proc Natl Acad Sci U S A* 2005;102:16569–72.
19 Kurichi JE, Kelz RR, Sonnad SS. Women authors of surgical research. *Arch Surg* 2005;140:1074–7.
20 Association of American Medical Colleges. Physician specialty data report, 2017. Available: https://www.aamc.org/data-reports/workforce/interactive-data/active-physicians-sex-and-specialty-2017
21 Murphy B, Association AM. These medical specialties have the biggest gender imbalances, 2019. Available: https://www.ama-assn.org/residents-students/specialty-profiles/these-medical-specialties-have-biggest-gender-imbalances
22 Aziz HA, DuCoin C, Welsh DJ. 2018 ACS governors survey: gender inequality and harassment remain a challenge in surgery. Bulletin of the American College of Surgeons. Available: https://bulletin.facs.org/2019/09/2018-acs-governors-survey-gender-inequality-and-harassment-remain-a-challenge-in-surgery/
23 Lyons NB, Bernardi K, Huang L, *et al*. Gender disparity in surgery: an evaluation of surgical societies. *Surg Infect* 2019;20:406–10.
24 Freischlag JA. Women surgeons--still in a male-dominated world. *Yale J Biol Med* 2008;81:203–4.
25 Hardy K, Today R. Diverse Views—A look behind the numbers of radiology gender disparity, 2020. Available: https://www.radiologytoday.net/archive/rt0420p18.shtml
26 WayBack Machine. Available: http://web.archive.org
27 University of California Employee Pay. Available: https://ucannualwage.ucop.edu/wage/
28 Goldin C. *Understanding the gender gap: an economic history of American women*. OUP Catalogue, 1992.
29 Goldin C. *A pollution theory of discrimination: male and female differences in occupations and earnings. human capital in history: the American record*. University of Chicago Press, 2014.
30 Sanfey H, Crandall M, Shaughnessy E, *et al*. Strategies for identifying and closing the gender salary gap in surgery. *J Am Coll Surg* 2017;225:333–8.
31 Bates C, Gordon L, Travis E, *et al*. Striving for gender equity in academic medicine careers: a call to action. *Acad Med* 2016;91:1050–2.
32 Addressing N. *Gender inequality action Task force. Addressing gender inequality in the NIH intramural research program action Task force report and recommendations*, 2016.
33 Robinson GE. Stresses on women physicians: consequences and coping techniques. *Depress Anxiety* 2003;17:180–9.
34 Gray K, Neville A, Kaji AH, *et al*. Career goals, salary expectations, and salary negotiation among male and female general surgery residents. *JAMA Surg* 2019;154:1023–9.
35 Hoops HE, Brasel KJ, Dewey E, *et al*. Analysis of gender-based differences in surgery faculty compensation, promotion, and retention: establishing equity. *Ann Surg* 2018;268:479–87.
36 Goldin C. A grand gender convergence: its last chapter. *Am Econ Rev* 2014;104:1091–119.