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## Gender-based pay differences in academic medicine reside in discretionary pay

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## 34 Abstract

35 **Objectives:** Previous studies demonstrate women faculty within academic medicine are paid less  
36 than their men counterparts. To close the wage gap in academic medicine, it is critical to know  
37 where this disparity originates. The primary objective was to evaluate differences in pay based  
38 on gender, rank and research productivity for three academic medical specialties with diverse  
39 gender distributions. The authors hypothesized that the wage gap would be largest outside of  
40 base pay across all ranks, even after accounting for rank and research productivity.

41 **Design:** This was a retrospective review of compensation for assistant, associate, and full  
42 professors during the year of 2016. Total compensation (“gross pay”) was defined as regular pay  
43 plus “other” pay.

44 **Setting:** A publicly available database was used to collect information on gross pay, regular pay,  
45 “other” pay, and rank.

46 **Participants:** Archived online faculty profiles were reviewed to collect information on gender.  
47 Elsevier’s SCOPUS was used to collect data on h-index, a measure of research productivity.  
48 Participants included 799 total faculty members, including 225 assistant, 200 associate, and 374  
49 full professors from general surgery, obstetrics and gynecology, and radiology departments at six  
50 state-run, publicly funded academic medical centers in the western United States.

51 **Results:** Gross salary was significantly higher for men across all professorial ranks in both  
52 general surgery and obstetrics and gynecology. This disparity originates from gaps in “other”  
53 pay, as regular pay was not significantly different between men and women.

54 **Conclusions:** Further investigations should focus more on discrepancies in discretionary or  
55 “other” pay which may preferentially benefit men. No significant gender difference in gross

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3 56 salary for radiology was found. Additional studies of radiology departments could identify ways  
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5 57 in which it could serve as a model for gender-based salary structures for clinicians.  
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9  
10 59 Strengths and limitations of the study

- 11  
12 60 • This is a large population study assessing distribution of salary among three diverse  
13  
14 61 disciplines based on their presumed gender distributions and distribution of the types of  
15  
16 62 clinical work.  
17  
18 63 • Linear regression models were estimated to determine the relationship between specialty,  
19  
20 64 gender, rank, h-index and income.  
21  
22 65 • We focus on only one set of state-based academic institutions from the west coast of the  
23  
24 66 United States and so are unable to be certain whether our findings would generalize to  
25  
26 67 private practices or to those in other parts of the country.  
27  
28 68 • We examined salaries from only three departments and therefore cannot be certain that  
29  
30 69 other clinical specialties would follow similar patterns.  
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32 70 • Our data was obtained from websites only, we are unable to delve more deeply into the  
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34 71 components of “other” salary beyond the general description that is offered publicly.  
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## 78 Introduction

79 The more education a woman has, the greater the disparity she will see in her wages.<sup>1</sup> This  
80 disparity is especially glaring for physicians and surgeons, with women earning about 72 cents  
81 for every dollar men earn.<sup>2</sup> Representation of women in medicine is increasing dramatically,  
82 however the gender income gap remains.<sup>3</sup> Women faculty have been shown to have lower  
83 salaries, smaller start-up packages, and limited authorship roles.<sup>4,5</sup> Despite the Equal Pay Act of  
84 1963, this gap continues to exist across specialties, practice settings, work hours, and other  
85 characteristics,<sup>6-10</sup> and persists even after accounting for age, experience, specialty, faculty rank,  
86 and measures of research productivity and clinical revenue.<sup>6-12</sup> Commonly cited explanations for  
87 this gender gap include differences in negotiating skills, opportunities to join networks of  
88 influence within organizations, discrimination, and implicit and explicit bias.<sup>6,7,9,13-15</sup>

89  
90 These issues span far beyond the medical setting. Despite making up almost half the workforce,  
91 women continue to earn less in nearly every single occupation for which there is sufficient  
92 earnings data to calculate an earnings ratio.<sup>16</sup> In general, the highest paid occupations have the  
93 largest wage gaps. According to the Institute for Women's Policy Research, it will take nearly 40  
94 years for women to finally reach pay parity if changes continue at the current rate.<sup>17</sup> Persistent  
95 pay inequality has far-reaching economic consequences; providing equal pay would cut the  
96 poverty rate for all working women in half.<sup>18</sup>

97  
98 There is an increasingly large body of evidence that gender not only impacts pay but also faculty  
99 rank and research productivity.<sup>6-12</sup> Gender disparities in faculty rank within academic medicine  
100 persist after accounting for age, years since completion of residency, specialty, scientific

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3 101 authorship, National Institutes of Health (NIH) research funding, clinical trial participation, and  
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5 102 clinical revenue.<sup>9</sup> In academic medicine specifically, there is a significant gender difference in  
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8 103 rate and impact of publications, with women showing lower productivity than men in surgical  
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10 104 specialties.<sup>12</sup>  
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12 105  
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14 106 In order to close the wage gap in academic medicine, we must be clear where in total  
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16 107 compensation packages this disparity originates. Data suggests that gender differences in income  
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18 108 can be attributed to the income gaps within specific occupations, not across occupations.<sup>19</sup> As  
19  
20 109 such, we chose to focus this study on academic salary at a single time point, expecting to see  
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22 110 differences in pay based on gender, faculty rank and h-index, a metric for evaluating the  
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24 111 cumulative impact of an author's scholarly output and performance calculated by comparing  
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26 112 number of publications to citations.<sup>20</sup> The primary objective of our study was to identify where in  
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28 113 total compensation the wage gap originates by evaluating differences in pay based on gender,  
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31 114 rank and research productivity for three diverse academic medical specialties. Our areas of  
32  
33 115 interest – income, academic rank, and research productivity – are typical benchmarks for  
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35 116 professional development.<sup>21</sup> Three diverse specialties – general surgery, obstetrics and  
36  
37 117 gynecology, and radiology - were chosen, primarily because of their presumed gender  
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39 118 distributions and distribution of the types of clinical work.<sup>22</sup> We hypothesized that women would  
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41 119 earn significantly less gross pay across all ranks, even after accounting for rank and research  
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43 120 productivity.  
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## 51 122 **Methods**

### 52 123 **Study Design**



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3 124 This was a retrospective population study of total faculty compensation for assistant, associate  
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5 125 and full professors at six major public academic medical centers using a single time point during  
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7 126 2016. We chose the time point of 2016 as it was the most recent year for which data was  
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10 127 available at the time. Three diverse disciplines were examined: general surgery, obstetrics &  
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12 128 gynecology, and radiology. General surgery is typically a male-dominated specialty, obstetrics  
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14 129 and gynecology a female-dominated specialty, while radiology has a more equal gender  
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17 130 distribution. There is also a diversity of clinical work throughout these three subspecialties with  
18  
19 131 general surgery being dominated by surgical procedures, radiology not being surgical in nature,  
20  
21 132 and obstetrics and gynecology with a more diverse balance of clinical work.<sup>3,23</sup> Ethics approval  
22  
23  
24 133 and consent to participate was waived by the Institutional Review Board of the Stanford  
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26 134 University School of Medicine.

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### 32 33 137 **Study Population**

34  
35 138 988 total employees were assessed for eligibility (see **Figure 1**). 110 (11%) were excluded for  
36  
37 139 having a role other than assistant, associate or professor. A further 79 (8%) were excluded  
38  
39 140 because they were listed on the department website but not in the payroll database. After  
40  
41 141 exclusions, our analysis included 799 faculty members, including 225 (28%) assistant, 200  
42  
43 142 (25%) associate, and 374 (47%) full professors. 312 (39%) were identified as women and 487  
44  
45 143 (61%) as men.

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### 50 51 145 **Patient and Public Involvement**

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3 146 How were the development of the research question and outcome measures informed by  
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5 147 patients' priorities, experiences, and preferences?  
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8 148 No patients were involved in the study. For this research question, we had a publicly available  
9  
10 149 data set of wages. Our research questions and outcome measures were developed to determine  
11  
12 150 equity in participants wages. Although specifically priorities and preferences were not asked, it is  
13  
14  
15 151 an important question to identify any wage discrepancies.

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17 152  
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19 153 How did you involve patients in the design of this study?

20  
21 154 No patients were involved in the design of study

22  
23  
24 155

25  
26 156 Were patients involved in the recruitment to and conduct of the study?

27  
28 157 No patients were involved in the design of study

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33 159 How will the results be disseminated to study participants?

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35 160 Data are already available in a publicly shared website. The results of our analysis of this  
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37 161 publicly available data will be disseminated by a publication of this manuscript.

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42 163 For randomized controlled trials, was the burden of the intervention assessed by patients  
43  
44 164 themselves? This was not a randomized control trial.

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### 48 166 **Total Compensation, Rank and Research Productivity**

49  
50 167 A publicly available database which contains all of the compensation information for faculty and  
51  
52 168 employees at a large university system was used to look at total faculty compensation in three  
53  
54 169 different ways: Gross Pay, Regular Pay, and Other Pay.<sup>24</sup> Gross Pay was defined as Regular Pay

170 plus Other Pay. Regular Pay was defined as Base Pay minus reductions due to participation in  
171 the voluntary Employee Reduction in Time and phased retirement programs. Other Pay  
172 (commonly referred to as “discretionary pay”) was defined as negotiated additional pay for  
173 clinical care and research which was funded from earned clinical revenue as well as contracts  
174 and grants. This includes: pay for Summer Session or University Extension teaching, pay for  
175 research performed during summer months that is funded by extramural contracts and grants,  
176 performance-based incentive compensation and similar payments that recognize achievement of  
177 specific performance goals or exemplary service, pay for shift differentials (e.g., night or holiday  
178 call), payout of unused vacation leave upon separation, and lump sum payments made as part of  
179 the settlement of union bargaining agreements. Data on academic rank and specialty was  
180 collected from the same database. The internet archive service Wayback Machine<sup>1</sup> was used to  
181 collect data on gender from 2016 online faculty profiles at each department’s website.  
182 Elsevier's SCOPUS was used to collect data on h-index. Faculty members’ h-indexes were  
183 obtained using their full name, last name and first and middle initials, and/or maiden name when  
184 appropriate.

## 186 **Statistical Analysis**

187 Our data set consisted of 6 variables: (1) Department – a three-level categorical variable  
188 (surgery, obstetrics & gynecology, and radiology); (2) Rank - three-level categorical variables  
189 (assistant, associate, and full); (3) Gender; (4) h-index – a measure of publication output; (5)  
190 Regular Pay – i.e. salary; and (6) Other pay – e.g. bonuses, pay for extra work. Linear regression  
191 models were estimated to determine the relationship between these factors and income. Pay was

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<sup>1</sup> The Internet Archive provides free access to over 20 years of web history accessible via the Wayback Machine:  
<https://archive.org/web/>

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2  
3 192 selected as our primary variable and gender, academic rank and h-index as secondary variables.  
4  
5 193 Rank, gender, and h-index were treated as independent variables, whereas “regular pay” and  
6  
7 194 “other pay” were treated as dependent variables. Because rank is a three-level categorical level, it  
8  
9  
10 195 was split into two dummy variables with “Full” as reference value. Three regression models  
11  
12 196 were run per department: one to predict gross pay (regular pay plus other pay), one to predict  
13  
14 197 regular pay, and one to predict other pay. Data was entered into SPSS version 20, with a *p* value  
15  
16 198 of less than 0.05 considered to be significant.  
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19 199

## 200 Results

201 Overall, women represented 26% of general surgery faculty (n=126), 70% of obstetrics and  
202 gynecology faculty (n=106), and 34% of radiology faculty (n=80). Women also made up 51% of  
203 all assistant professors (n=115), 40% of associate professors (n=79), and 32% of full professors  
204 (n=118) (see **Table 1**). Distribution of gross pay, regular pay, and other pay stratified by gender  
205 and academic rank is presented in **Figure 2** and **Table 2**.

### 207 General Surgery

208 Distribution of pay for general surgery is presented in **Figure 3**. Within general surgery, the  
209 overall regression for gross pay was significant ( $R^2 = .159$ ,  $F(4, 299) = 14.123$ ,  $p < .01$ ).  
210 Gender was significantly different with women earning lower gross salaries than men (  
211  $\beta = -84,970$ ,  $p < 0.05$ ). Rank was not significantly different for gross pay; however, higher h-  
212 index was significantly associated with higher gross pay ( $\beta = 5,023$ ,  $p < 0.01$ ).  
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3 214 In an attempt to analyze what specifically drove the effect on gross pay, we ran an analysis on  
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5 215 “regular pay” and “other pay” separately. In terms of regular pay, the overall regression was  
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7 216 significant ( $R^2 = 0.323$ ,  $F(4, 299) = 35.737$ ,  $p < 0.01$ ). However, gender was not  
8  
9 217 significantly associated with regular pay with men and women receiving similar regular salaries.  
10  
11 218 Unsurprisingly, rank was associated with regular salary, with assistant professors (  
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13 219  $\beta = -51,031$ ,  $p < .01$ ) and associate professors ( $\beta = -40,680$ ,  $p < 0.01$ ) earning significantly  
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15 220 less regular pay than full professors. Higher h-index was also significantly associated with  
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17 221 higher regular pay ( $\beta = 1,606$ ,  $p < .01$ ).  
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24 223 For “other pay”, the overall regression was significant ( $R^2 = 0.096$ ,  $F(4, 299)$   
25  
26 224  $= 7.900$ ,  $p < 0.01$ ). Furthermore, gender was significantly associated with “other pay” (  
27  
28 225  $\beta = -79,467$ ,  $p < 0.05$ ) with women earning significantly less of this salary component than  
29  
30 226 men. There was no difference in rank in “other pay”. Higher h-index was significantly associated  
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32 227 with “other pay” ( $\beta = 3,418$ ,  $p < 0.01$ ).  
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### 228 229 **Obstetrics and Gynecology**

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40 230 Distribution of pay for obstetrics and gynecology is presented in **Figure 4**. For obstetrics and  
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42 231 gynecology, the overall regression for gross pay was significant ( $R^2 = 0.068$ ,  $F(4, 174)$   
43  
44 232  $= 3.172$ ,  $p < 0.05$ ). There was a significant difference in gender, with women earning less  
45  
46 233 gross pay than men ( $\beta = -84,221$ ,  $p < 0.02$ ). Rank was not found to be significantly different  
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48 234 for gross pay for either assistant or associate professors compared to full professors. H-index was  
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50 235 also not significantly associated with gross pay.  
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237 For regular pay, the overall regression was significant ( $R^2 = 0.485$ ,  $F(4, 174)$   
238  $= 40.986$ ,  $p < 0.01$ ). There was no significant difference between women and men in regular  
239 pay. Rank was associated with regular pay, with both assistant ( $\beta = -52,696$ ,  $p < 0.01$ ) and  
240 associate professors ( $\beta = -36,711$ ,  $p < 0.01$ ) earning significantly less than full professors. H-  
241 index was also significant ( $\beta = 1,314$ ,  $p < 0.01$ ), with higher h-index linked to higher regular  
242 pay.

244 For “other pay”, the overall regression was not significant ( $R^2 = .037$ ,  $F(4, 174) = 1.666$ , *n.s.*).  
245 However, there was a significant difference in gender, with women earning less other pay than  
246 men ( $\beta = -74,168$ ,  $p < 0.05$ ). There were no significant differences in “other pay” for the  
247 variables of rank or h-index.

## 249 Radiology

250 Distribution of pay for radiology is presented in **Figure 5**. Within radiology, the overall  
251 regression for gross pay was not significant ( $R^2 = 0.01$ ,  $F(4,266) = .591$ , *n.s.*). No factors  
252 showed any significant association with gross pay.

253 In terms of regular pay, the overall regression was significant ( $R^2$   
254  $= 0.395$ ,  $F(4,265) = 43.293$ ,  $p < 0.01$ ). However, gender was not significantly associated  
255 with regular pay as men and women earned similar base salaries. Significant differences in  
256 regular salary by rank were identified with assistant professors ( $\beta = -52,145$ ,  $p < 0.01$ ) and  
257 associate professors ( $\beta = -43,848$ ,  $p < 0.01$ ) earning significantly less regular pay than full  
258 professors. Higher h-index was also significantly associated with higher regular pay (  
259  $\beta = 979$ ,  $p < 0.01$ ).

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3 260 For “other pay”, the overall regression was significant ( $R^2 = 0.064$ ,  $F(4, 266)$   
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6 261  $= 4.567$ ,  $p < 0.01$ ); however, there was no significant association between gender and “other  
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8 262 pay”. Rank was also not associated with “other pay”. H-index was significantly associated with  
9  
10 263 “other pay” ( $\beta = -947$ ,  $p < 0.05$ ), with a higher h-index linked to lower “other pay”.  
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## 14 15 265 **Discussion**

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18 266 Our results show that while there are significant differences in gross pay for women faculty in  
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20 267 general surgery and obstetrics and gynecology, it is not “base” or regular pay that accounts for  
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22 268 the income gap between women and men. Instead, other components of income, classified in our  
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24 269 data as “other pay,” appear to contribute to acknowledged differences in salary between female  
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26 270 and male faculty members within our target institutions. In our review of publicly available  
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28 271 salary data,<sup>24</sup> women faculty within the departments of general surgery and obstetrics and  
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30 272 gynecology earned almost \$75,000 less than their men colleagues. This “other pay” is described  
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32 273 as coming from additional clinical responsibilities such as call pay as well as support for  
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34 274 administrative work or leadership positions.<sup>24</sup> These findings echo the work of the economist  
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36 275 Claudia Goldin who has described the gender pay gap in a variety of professions as being related  
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38 276 not to differences in “base” pay but rather to differences related to flexibility or amount of work  
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40 277 that is taken on by women versus men.<sup>25,26</sup>  
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47  
48 279 Previous studies offer many theories to explain the gender gap, including women are less likely  
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50 280 to be asked to serve as leaders, experience effective mentoring, receive equitable allocation of  
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52 281 research funding, and seek additional call hours or clinical work in favor of different household  
53  
54 282 and childrearing obligations.<sup>3,27</sup> Women faculty who work flexible hours may be less likely than  
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283 men to receive leadership positions that result in bonus salary.<sup>27</sup> In fact, faculty who need a more  
284 flexible work schedule remain as junior faculty and receive less support.<sup>28</sup> These circumstances  
285 help to explain our findings the lower “additional” or “other” pay for women faculty within the  
286 two specialties. One solution is to alter promotion policies to better support the diversity of  
287 needs.<sup>28</sup> Additional solutions can be found in the NIH’s Gender Inequality Task Force Report.<sup>29</sup>  
288  
289 Interestingly, the gender gap for “other” pay in our study was true within obstetrics and  
290 gynecology, despite the fact that women comprise a majority of faculty members within this  
291 specialty. Furthermore, no gender gap was identified for the department of radiology, despite its  
292 male predominance. This finding suggests that the gender distribution of the department alone  
293 does not necessarily guide pay discrepancies between women and men faculty members. Instead,  
294 it seems that other factors, such as the nature of the clinical work itself, may contribute to the  
295 gender salary gap.<sup>27</sup> It has been acknowledged in previous studies that surgical subspecialties are  
296 highly technical and predominantly occupied by men, and often times men are among the highest  
297 paid with roles as researchers, opposed to women within these specialties occupying lower status  
298 communal roles as educators.<sup>27</sup> For instance, no gender differences were noted for any portion of  
299 salaries within the radiology departments which we examined in this study. Radiology clinical  
300 work differs from that of other specialties in that it is predominantly shift-based and less  
301 procedural than general surgery and obstetrics and gynecology. Radiology may thereby offer  
302 fewer opportunities for gender-based increases to “other pay” which might be earned through  
303 additional clinical work.

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3 305 Our findings also validate previous studies finding striking gender inequities in the higher  
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5 306 academic ranks.<sup>12</sup> Common explanations for these gender differences include the gender-based  
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7 307 hiring disparities of previous generations, lack of transparency of salary, promotion, mentoring  
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10 308 and female role-models, and time away for childbearing and family obligations.<sup>27,28,30</sup> There is  
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12 309 also recent evidence that women physicians might start their career with lower salary  
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14 310 expectations than men, which could become a self-fulfilling prophecy for later pay.<sup>27,31</sup>  
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17 311 Furthermore, there is some indication that women prioritize salary less than men do and are  
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19 312 judged more harshly for initiating negotiations.<sup>6,27</sup>  
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23  
24 314 In summary, gender disparities have been well documented in academic medicine, and our study  
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26 315 offers a unique perspective of the different components that make up the academic medicine  
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28 316 physician salary. Previous studies have offered suggestions to improve this disparity, which will  
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30 317 be important for closing this “other” pay gap. Suggestions include transparency of starting  
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32 318 salaries to young professionals, initiating negotiation training to improve starting salary  
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34 319 packages, mentorship in career advancement for women junior faculty, investigation of research  
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36 320 grant award processes, and further adoption of programs to address disparities in grant award  
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38 321 processes.<sup>28</sup> Implementation of a university-wide objective compensation planned implemented  
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40 322 by the Association of American Medical Colleges regional median salary (AAMC-WRMS) was  
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42 323 associated with reduced gender-based differences in salary among surgery faculty within the  
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44 324 institution and a statistically significant increase in salary among female faculty. Objective  
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46 325 compensation plans may mitigate gender-based implicit bias in salary negotiations and  
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48 326 promotions.<sup>32</sup>  
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## 328 **Limitations**

329 Our study has several limitations. First, we focus on only one set of state-based academic  
330 institutions from the west coast of the United States and so are unable to be certain whether our  
331 findings would generalize to private practices or to those in other parts of the country.  
332 Furthermore, we examined salaries from only three departments and therefore cannot be certain  
333 that other clinical specialties would follow similar patterns. However, the departments were  
334 chosen to accurately reflect a set of departments with a diverse set of gender distribution and  
335 clinical work. Finally, since our data was obtained from websites only, we are unable to delve  
336 more deeply into the components of “other” salary beyond the general description that is offered  
337 publicly.

## 339 **Conclusion**

340 In sum, our study observed the trends of salary within three clinical specialties at state-run,  
341 publicly funded academic institutions. For this sample, gender differences were most notable in  
342 the fields of general surgery and obstetrics and gynecology. We suggest that further  
343 investigations should focus less on gender inequities of base salary, which may not be relevant to  
344 clinical faculty in academic settings as they are institutionally set to be independent of gender,  
345 and more on discrepancies in discretionary or “other” pay which may preferentially benefit men.  
346 With closer analysis, we might be able to achieve a better understanding of whether women are  
347 not receiving their full earning potential or, as has been suggested in the economic literature,<sup>25,33</sup>  
348 whether they are instead prioritizing flexibility in work hours over compensation. Finally, with  
349 our observation that the gender salary gap might not be as prominent within the field of

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3 350 radiology, additional studies of this specialty could identify ways in which it could serve as a  
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5 351 model for gender-based salary structures for clinicians.  
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19 357 **Figure 1. Participant Exclusions.** Participants included 799 faculty members. 988 institution  
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21 358 employees were assessed for eligibility. 189 were excluded for having a non-professorial, full-  
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23 359 time role. A further 79 were excluded for only being listed on the department website, not being  
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25 360 on 2016 payroll.  
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30 362 **Figure 2. Overall Pay.** Distribution of gross pay (A), regular pay (B) and “other pay” (C) of  
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32 363 women and men in general surgery, obstetrics and gynecology, and radiology departments  
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34 364 stratified by academic rank.  
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42 367 **Figure 3. General Surgery Pay.** Distribution of gross pay (A), regular pay (B) and “other pay”  
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44 368 (C) of women and men in general surgery stratified by academic rank.  
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51 371 **Figure 4. Obstetrics and Gynecology Pay.** Distribution of gross pay (A), regular pay (B) and  
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53 372 “other pay” (C) of women and men in obstetrics and gynecology stratified by academic rank.  
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375 **Figure 5. Radiology Pay.** Distribution of gross pay (A), regular pay (B) and “other pay” (C) of  
376 women and men in radiology stratified by academic rank.

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379 **Table 1.** Demographic data for women and men faculty by institution and department at six  
380 academic institutions in 2016.

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

381 <sup>1</sup>Women; <sup>2</sup>Men

382 <sup>3</sup>Institution 4 did not have a surgery or radiology department.

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**Table 2.** Average gross, base and “other” pay stratified by department, rank and gender at six academic institutions in 2016.

<i>Department</i>	<i>Rank</i>	<i>Gender</i>	<i>Total</i>	<i>Gross Pay (Mean ± SD)</i>	<i>Base Pay (Mean ± SD)</i>	<i>Other Pay (Mean ± SD)</i>
<i>General Surgery</i>	Assistant	W <sup>1</sup>	58	325,154 ± 167,202	100,013±21,259	<b>225,141±165,366</b>
		M <sup>2</sup>	9	401,248 ± 211,949	102,668±10,160	<b>298,580±215,319</b>
	Associate	W	27	321,560 ± 137,854	127,005±28,489	<b>194,556±129,298</b>
		M	9	463,437 ± 209,438	118,118±7,564	<b>345,320±211,383</b>
	Professor	W	41	355,631±135,205	160,583±40,006	<b>195,048±114,816</b>
	M	36	431,458±265,881	193,647±70,290	<b>237,811±235,410</b>	
<i>Ob/Gyn</i>	Assistant	W	31	272,521±117,227	106,264±27,706	<b>166,257±97,851</b>
		M	58	306,085±108,154	111,412±26,998	<b>194,673±89,110</b>
	Associate	W	26	306,375±117,688	128,085±27,904	<b>178,291±97,833</b>
		M	48	318,068±138,353	128,023±34,574	<b>190,045±114,220</b>
	Professor	W	49	349,216±121,677	189,281±61,148	<b>160,329±90,079</b>
	M	102	330,763±155,221	190,616±65,553	<b>140,147±122,192</b>	
<i>Radiology</i>	Assistant	W	26	271,733±101,797	116,400±32,331	<b>155,333±78,648</b>
		M	43	317,801±180,669	116,310±45,245	<b>201,492±149,107</b>
	Associate	W	26	334,010±192,702	129,735±46,725	<b>204,274±167,891</b>
		M	64	439,549±272,289	142,086±53,949	<b>297,463±250,756</b>
	Professor	W	28	432,943±221,201	196,264±65,213	<b>236,680±185,151</b>
	M	118	552,015±365,815	207,686±88,078	<b>344,329±320,399</b>	

<sup>1</sup>Women; <sup>2</sup>Men

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15 405 **Author's contributions:** Hayley Miller was a major contributor in the writing of the manuscript.  
16  
17 406 Elizabeth Seckel analyzed and interpreted the data and contributed to manuscript preparation.  
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19 407 Chrislyn White performed data abstraction and collection. Diana Sanchez performed data  
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21 408 abstraction and collection. Erika Rubesova edited the manuscript. Claudia Mueller designed the  
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23 409 study, analyzed and interpreted the data and was a major contributor in writing of the  
24  
25 410 manuscript. Katherine Bianco designed the study, analyzed and interpreted the data and was a  
26  
27 411 major contributor in writing of the manuscript. All authors read and approved the final  
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29 412 manuscript.  
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44 418 interests.  
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51 421 commercial or not-for-profit sectors.  
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3 423 **Data sharing statement:** All data is publicly available.  
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8 425 **Ethics approval and consent to participate** for this study was waived by the Institutional  
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10 426 Review Board of the Stanford University School of Medicine.  
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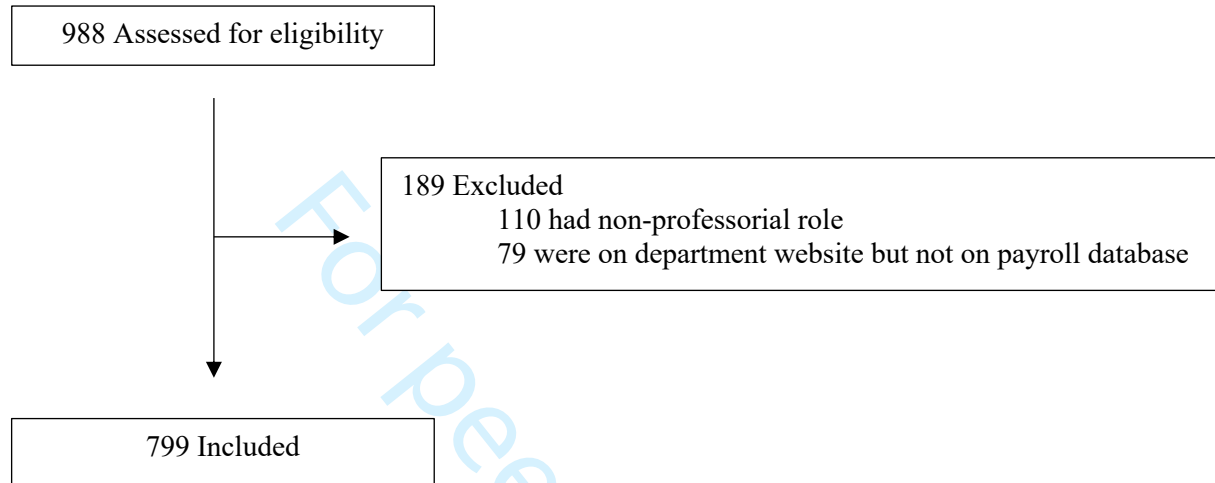
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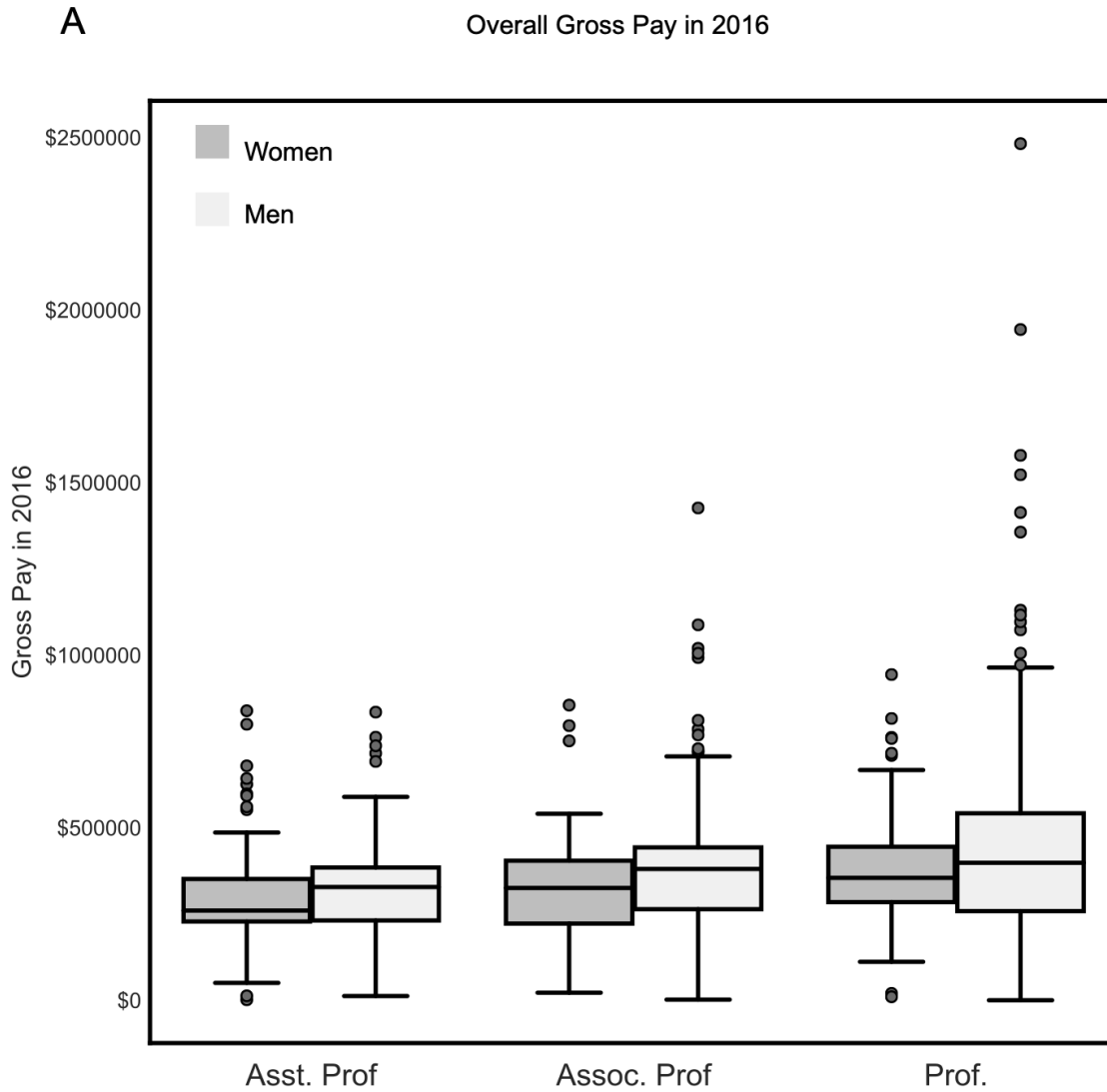
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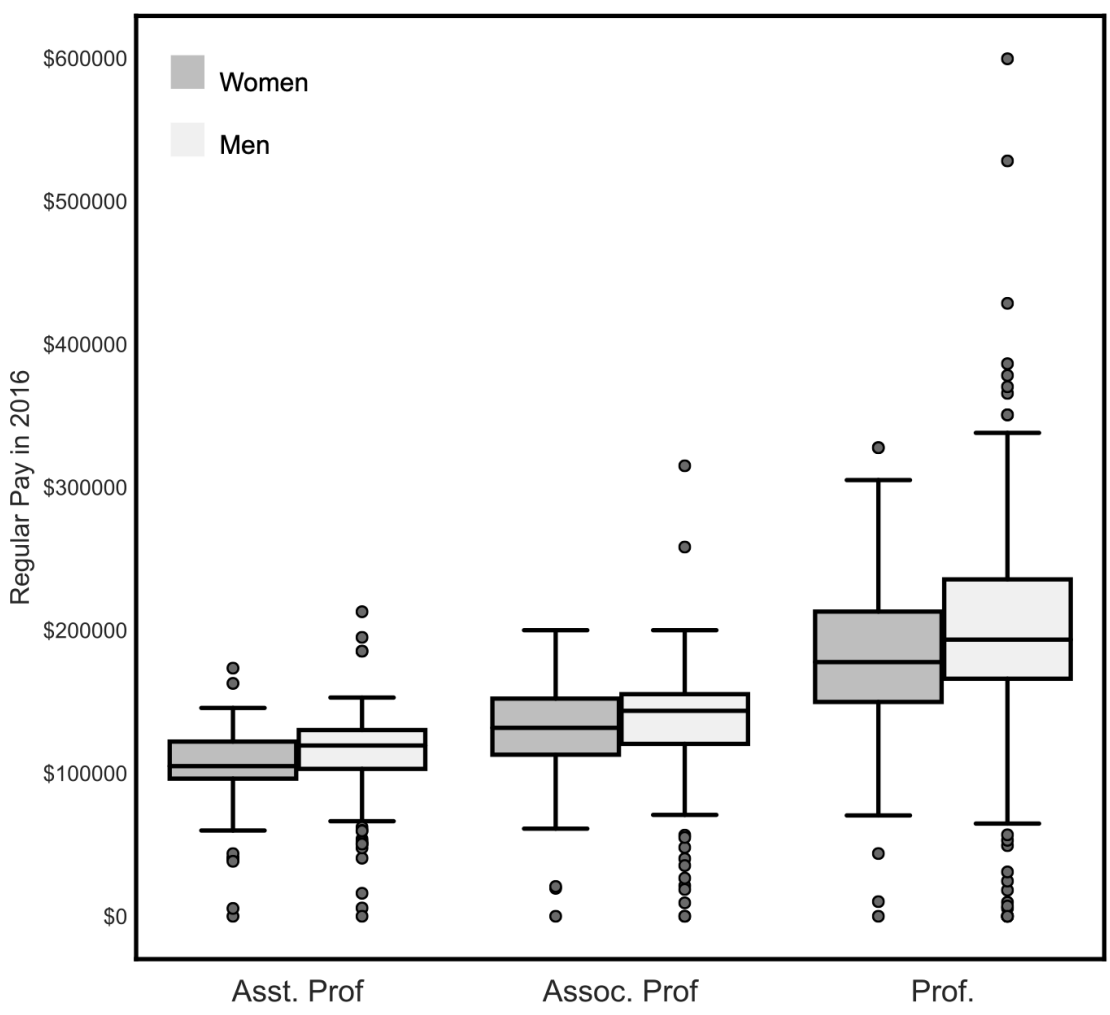


**Figure 2. Overall Pay.** Distribution of gross pay (A), regular pay (B) and “other pay” (C) of women and men in general surgery, obstetrics and gynecology, and radiology departments stratified by academic rank.



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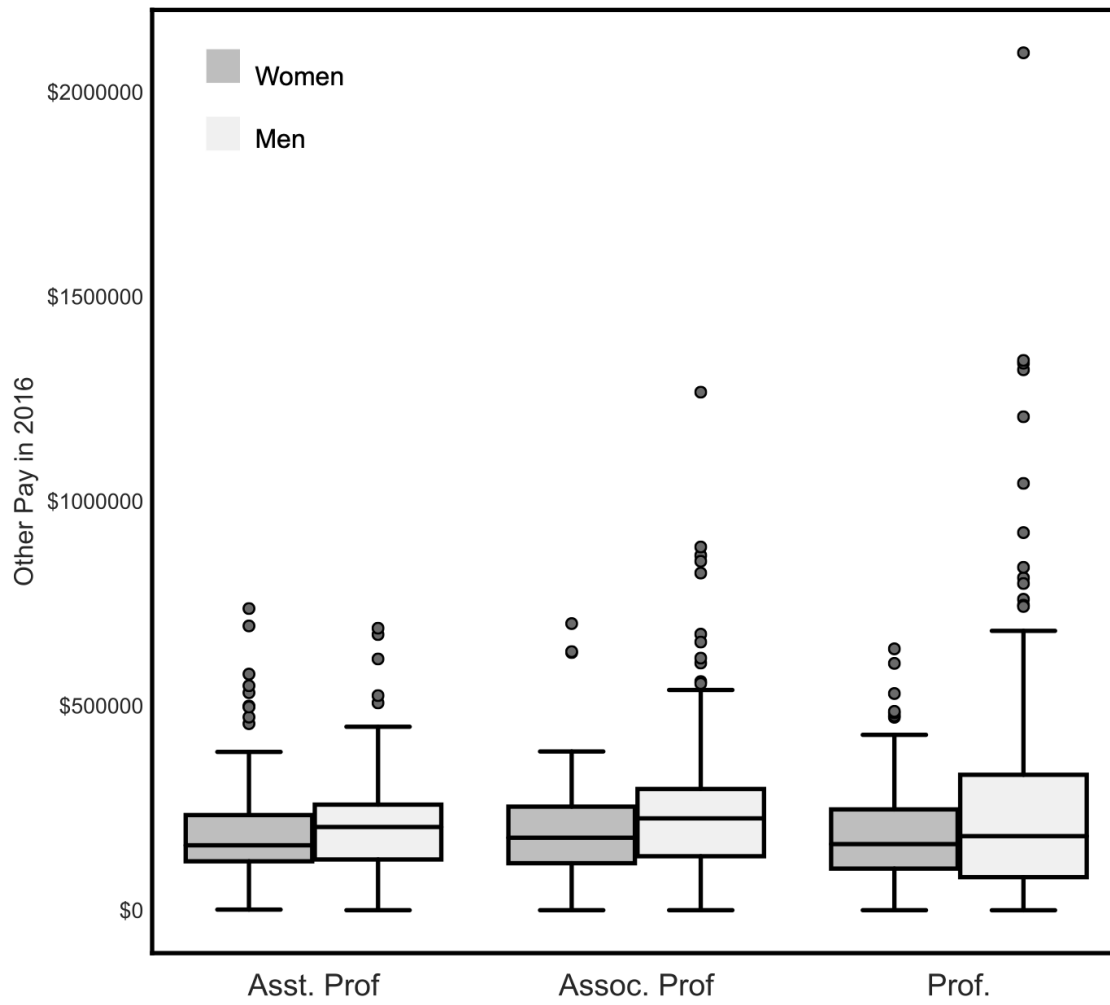
**B** Overall Regular Pay in 2016



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C

Overall Other Pay in 2016

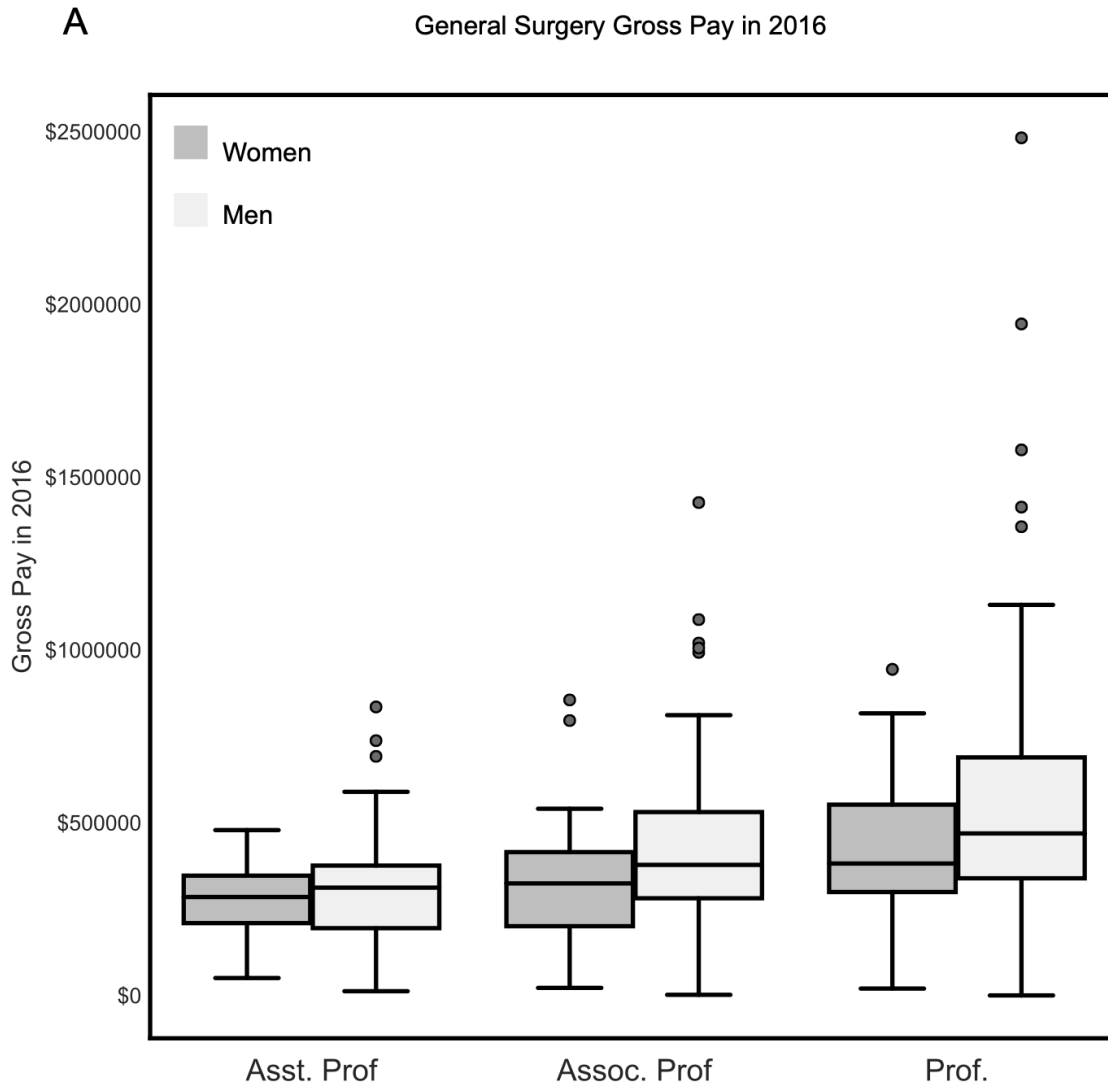


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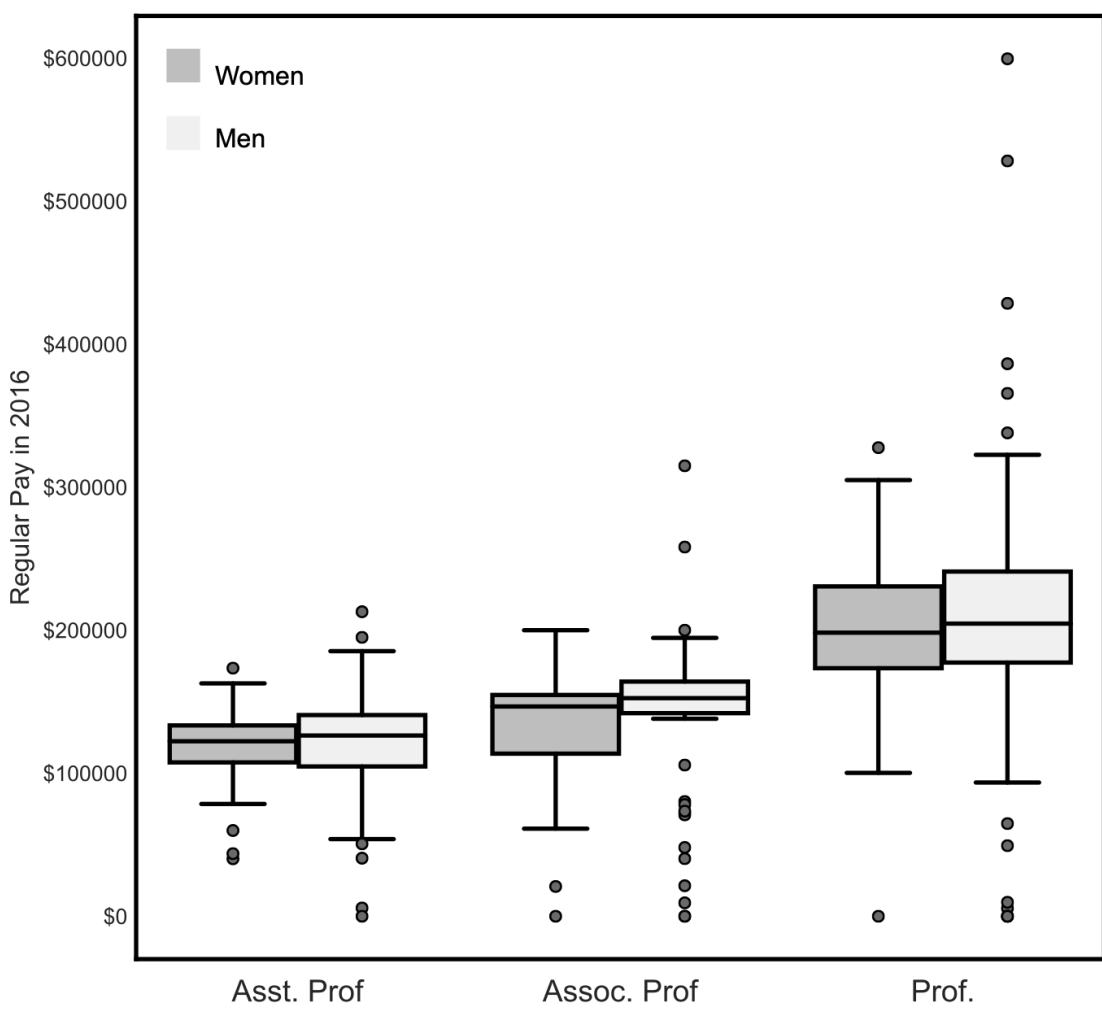
**Figure 3. General Surgery Pay.** Distribution of gross pay (A), regular pay (B) and “other pay” (C) of women and men in general surgery stratified by academic rank.





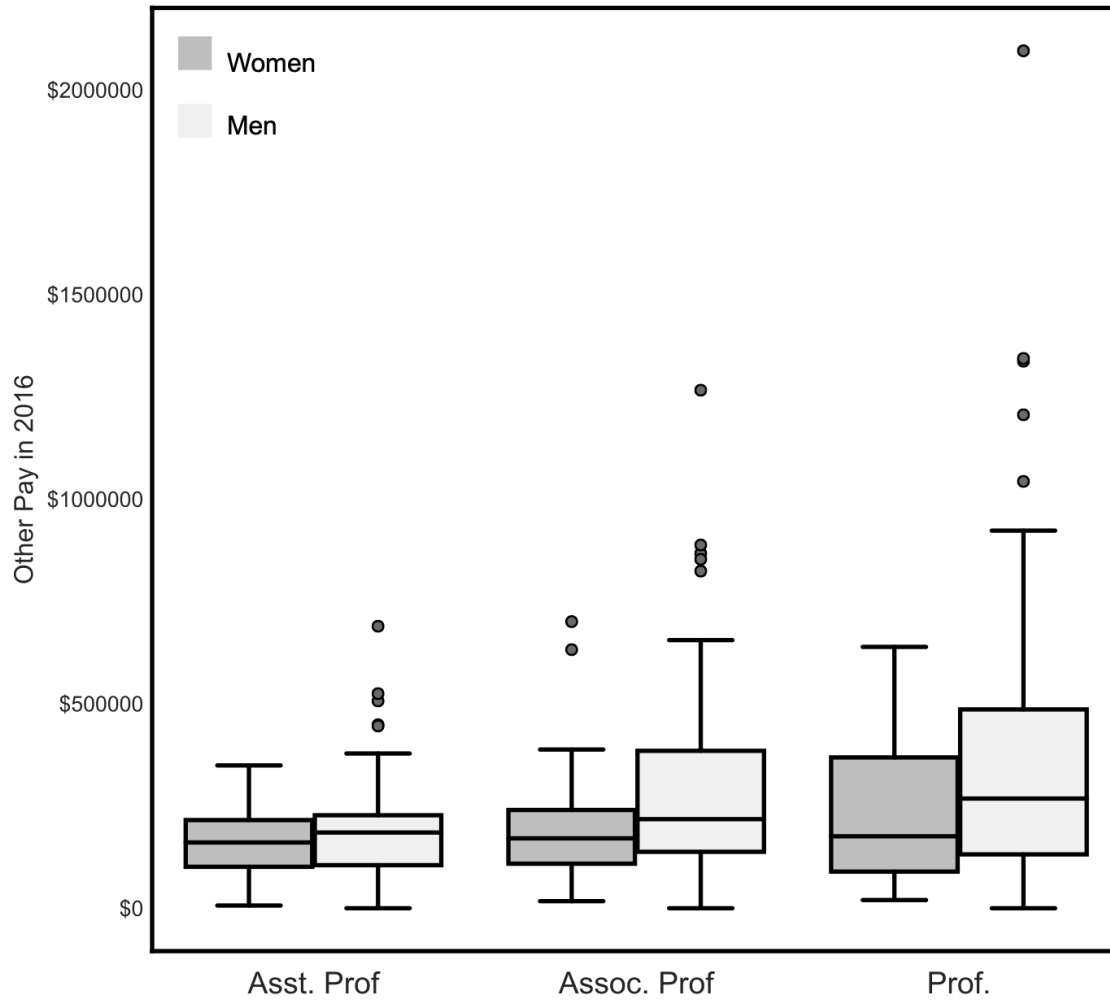
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**B** General Surgery Regular Pay in 2016

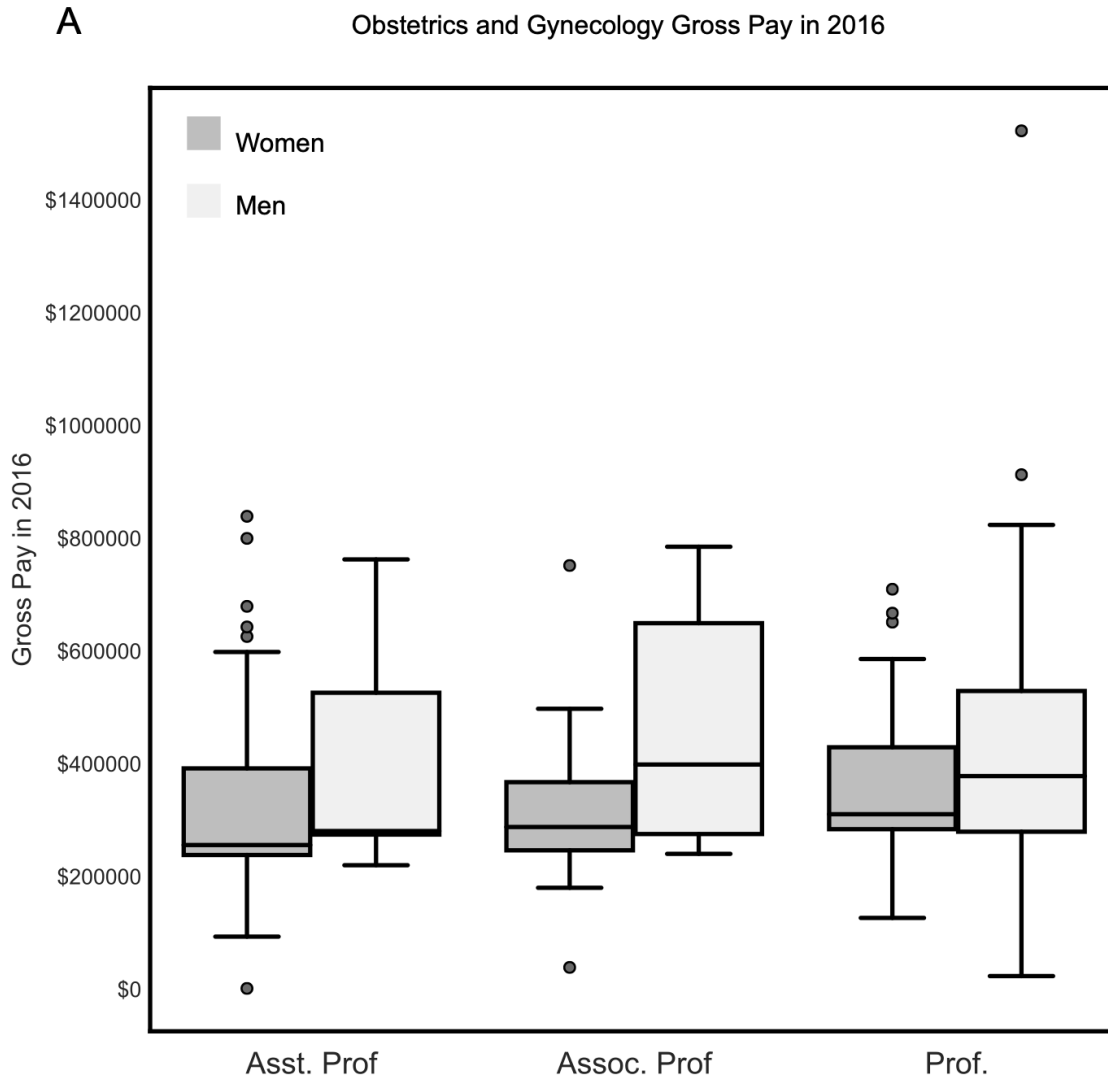


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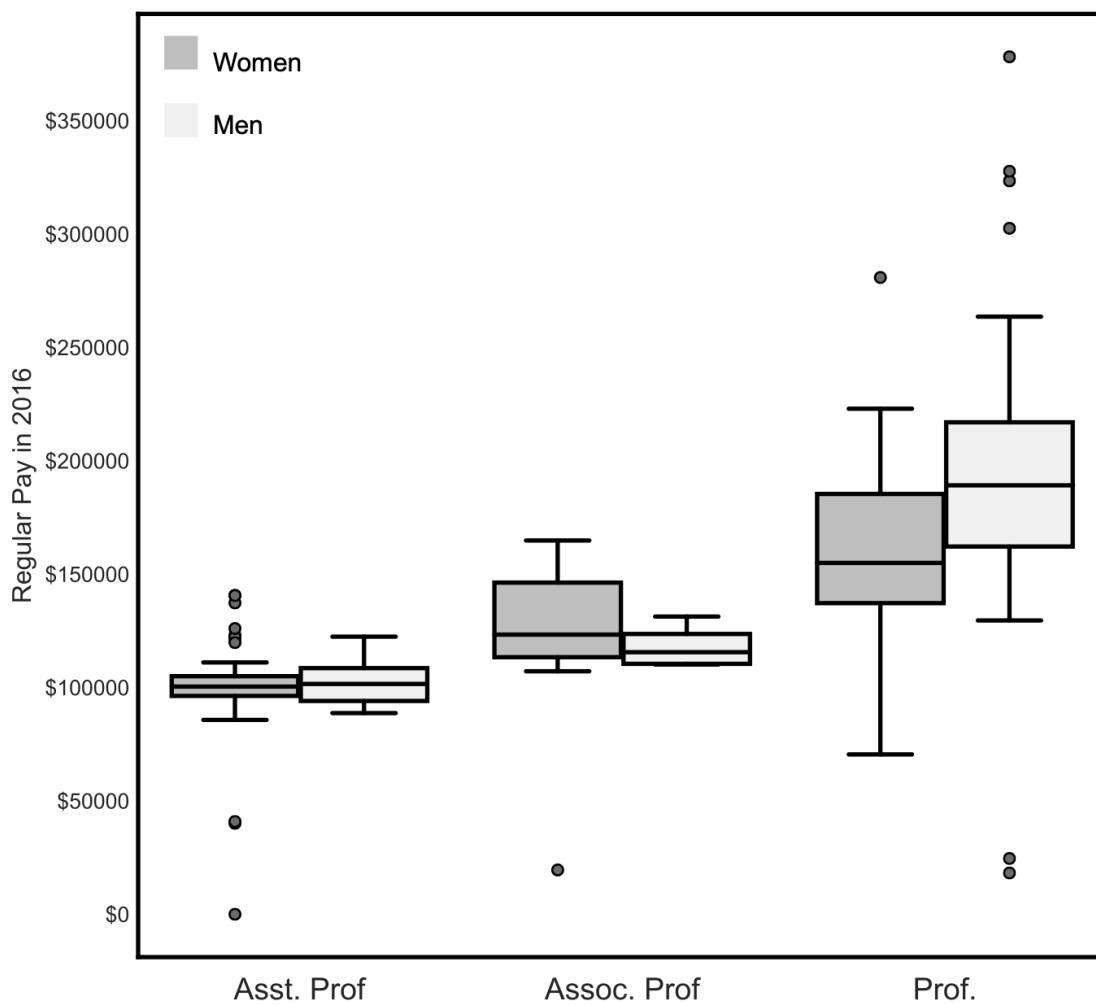
General Surgery Other Pay in 2016



**Figure 4. Obstetrics and Gynecology Pay.** Distribution of gross pay (A), regular pay (B) and “other pay” (C) of women and men in obstetrics and gynecology stratified by academic rank.

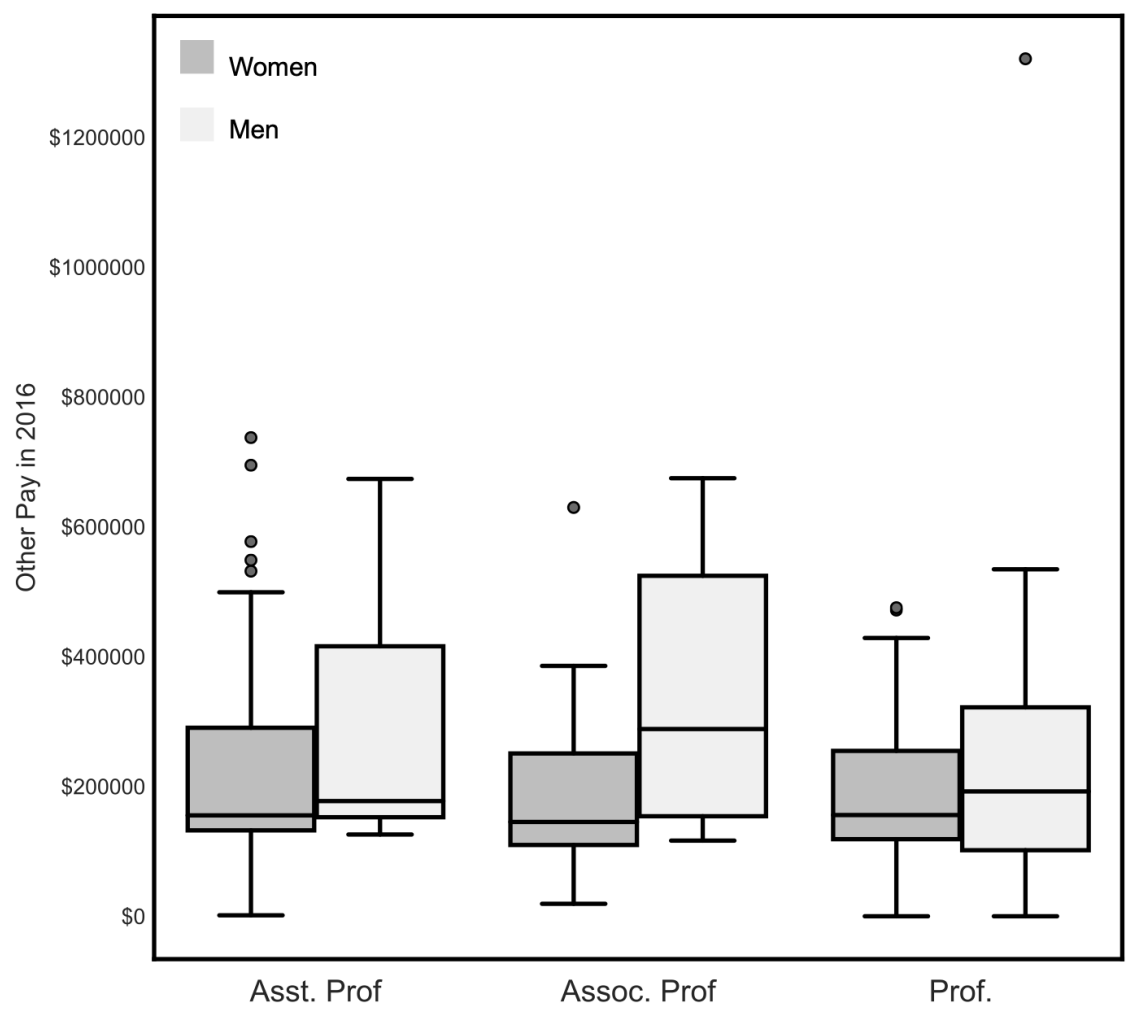


**B** Obstetrics and Gynecology Regular Pay in 2016

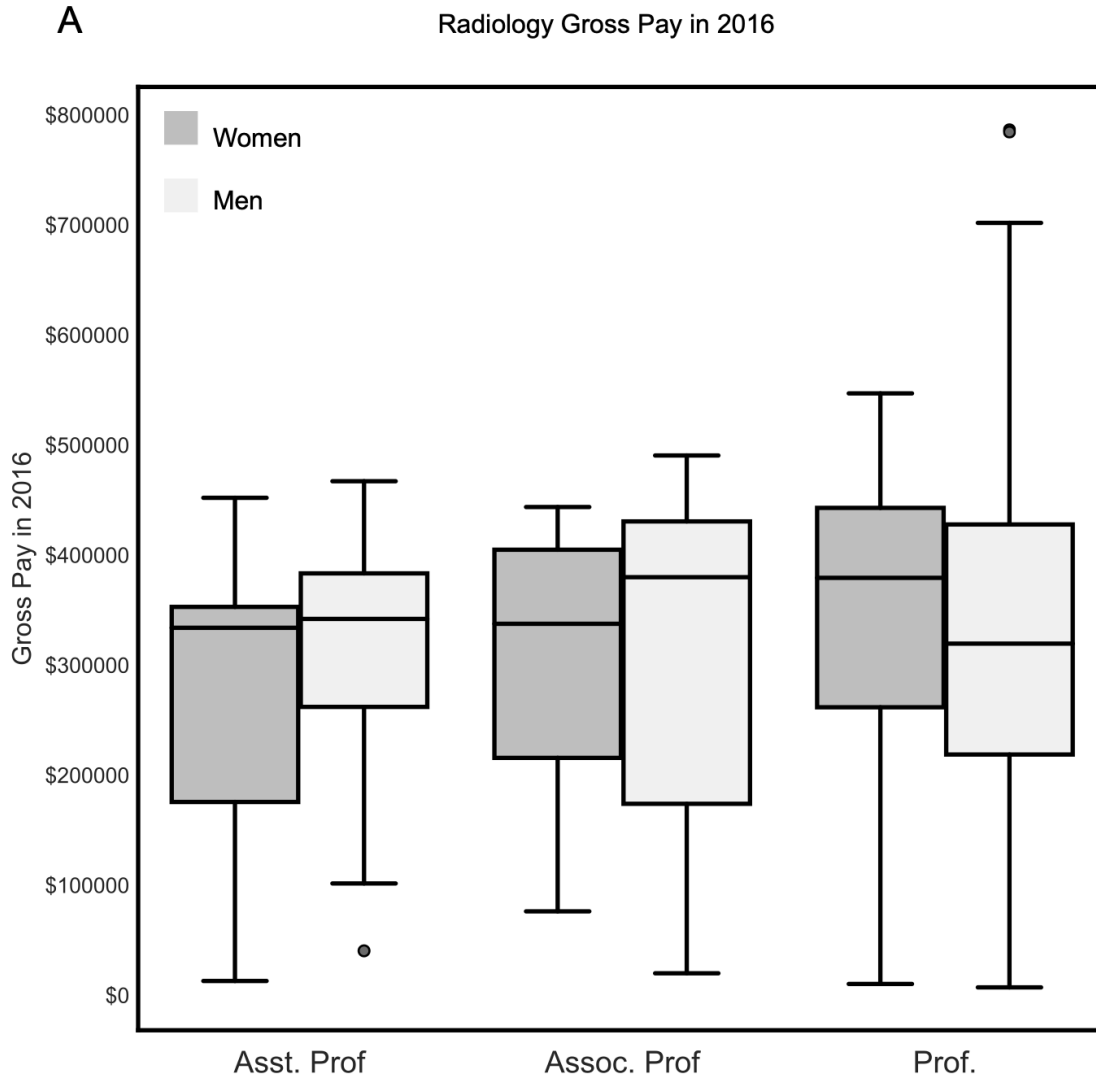


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C Obstetrics and Gynecology Other Pay in 2016

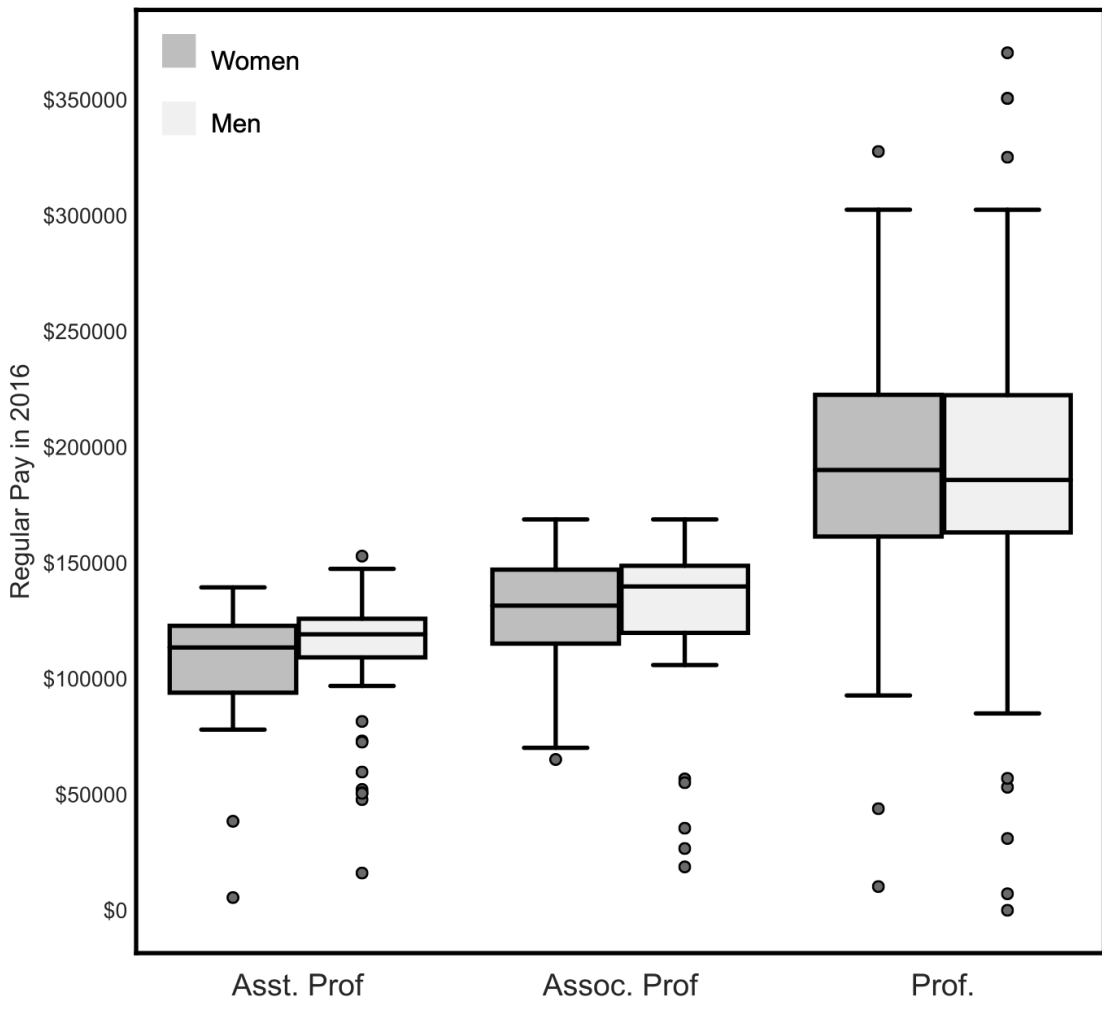


**Figure 5. Radiology Pay.** Distribution of gross pay (A), regular pay (B) and “other pay” (C) of women and men in radiology stratified by academic rank.

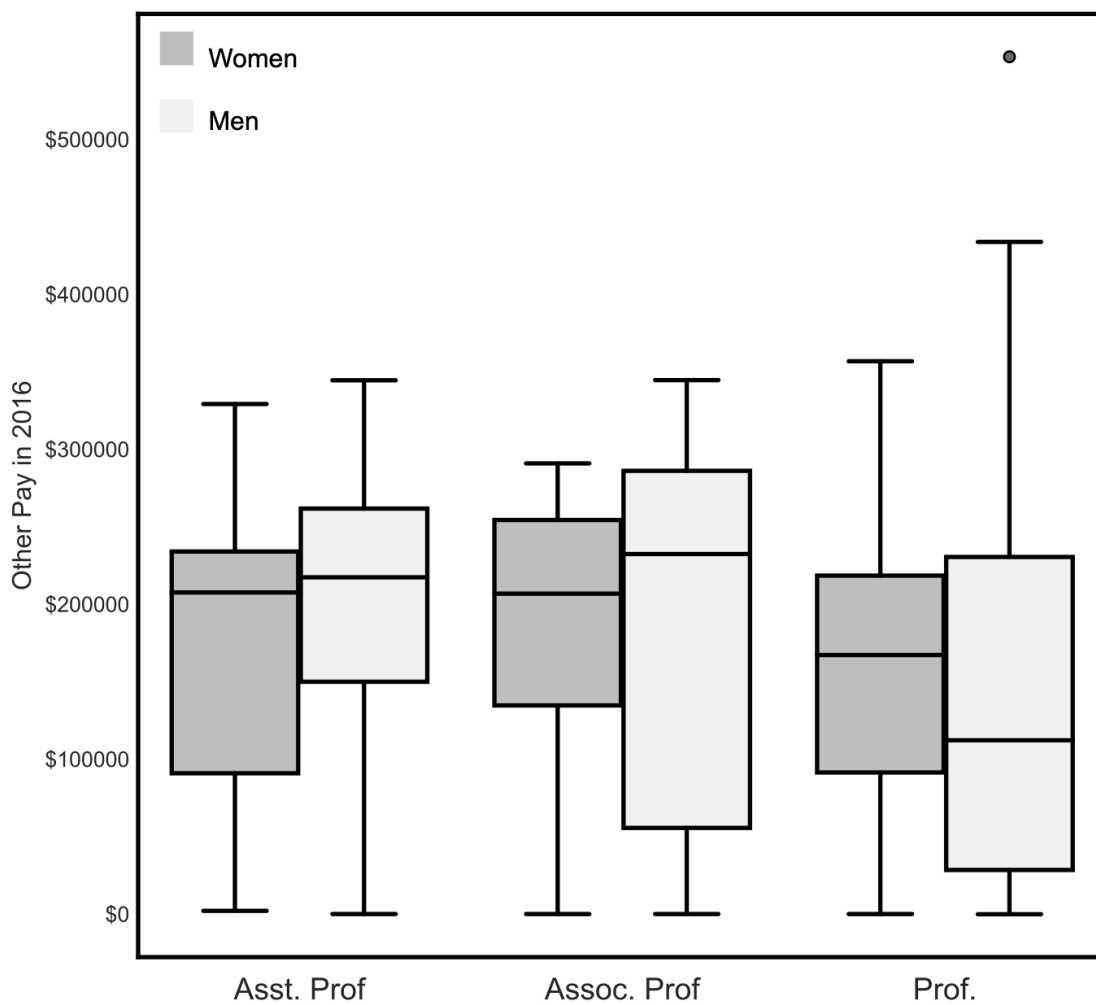


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**B** Radiology Regular Pay in 2016



C Radiology Other Pay in 2016





**CHEERS Checklist****Items to include when reporting economic evaluations of health interventions**

The **ISPOR CHEERS Task Force Report**, *Consolidated Health Economic Evaluation Reporting Standards (CHEERS)—Explanation and Elaboration: A Report of the ISPOR Health Economic Evaluations Publication Guidelines Good Reporting Practices Task Force*, provides examples and further discussion of the 24-item CHEERS Checklist and the CHEERS Statement. It may be accessed via the *Value in Health* or via the ISPOR Health Economic Evaluation Publication Guidelines – CHEERS: Good Reporting Practices webpage: <http://www.ispor.org/TaskForces/EconomicPubGuidelines.asp>

Section/item	Item No	Recommendation	Reported on page No/line No
<b>Title and abstract</b>			
Title	1	Identify the study as an economic evaluation or use more specific terms such as “cost-effectiveness analysis”, and describe the interventions compared.	1
Abstract	2	Provide a structured summary of objectives, perspective, setting, methods (including study design and inputs), results (including base case and uncertainty analyses), and conclusions.	2
<b>Introduction</b>			
Background and objectives	3	Provide an explicit statement of the broader context for the study. Present the study question and its relevance for health policy or practice decisions.	4-5
<b>Methods</b>			
Target population and subgroups	4	Describe characteristics of the base case population and subgroups analysed, including why they were chosen.	6
Setting and location	5	State relevant aspects of the system(s) in which the decision(s) need(s) to be made.	6-8
Study perspective	6	Describe the perspective of the study and relate this to the costs being evaluated.	6-8
Comparators	7	Describe the interventions or strategies being compared and state why they were chosen.	6-8
Time horizon	8	State the time horizon(s) over which costs and consequences are being evaluated and say why appropriate.	6
Discount rate	9	Report the choice of discount rate(s) used for costs and outcomes and say why appropriate.	N/A
Choice of health outcomes	10	Describe what outcomes were used as the measure(s) of benefit in the evaluation and their relevance for the type of analysis performed.	7-8
Measurement of effectiveness	11a	<i>Single study-based estimates:</i> Describe fully the design features of the single effectiveness study and why the single study was a sufficient source of clinical effectiveness data.	6-8

			N/A
1		11b	N/A
2			6-8
3			6-8
4	Measurement and	12	6-8
5	valuation of preference		6-8
6	based outcomes		6-8
7			6-8
8	Estimating resources	13a	6-8
9	and costs		6-8
10			6-8
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22	Currency, price date,	14	6-8
23	and conversion		6-8
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26			6-8
27			6-8
28	Choice of model	15	6-8
29			6-8
30			6-8
31			6-8
32	Assumptions	16	6-8
33			6-8
34	Analytical methods	17	6-8
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42	<b>Results</b>		
43	Study parameters	18	6-8
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48			6-8
49	Incremental costs and	19	6-8
50	outcomes		6-8
51			6-8
52			6-8
53	Characterising	20a	6-8
54	uncertainty		6-8
55			6-8
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59			6-8
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1		of methodological assumptions (such as discount rate, study perspective).	N/A
2			
3			
4	20b	<i>Model-based economic evaluation</i> : Describe the effects on the results of uncertainty for all input parameters, and uncertainty related to the structure of the model and assumptions.	9-11
5			
6			
7	Characterising heterogeneity	21	
8		If applicable, report differences in costs, outcomes, or cost-effectiveness that can be explained by variations between subgroups of patients with different baseline characteristics or other observed variability in effects that are not reducible by more information.	12-14
9			
10			
11			
12			
13	<b>Discussion</b>		
14	Study findings, limitations, generalisability, and current knowledge	22	
15		Summarise key study findings and describe how they support the conclusions reached. Discuss limitations and the generalisability of the findings and how the findings fit with current knowledge.	19
16			
17			
18			
19	<b>Other</b>		
20	Source of funding	23	
21		Describe how the study was funded and the role of the funder in the identification, design, conduct, and reporting of the analysis. Describe other non-monetary sources of support.	19
22			
23			
24	Conflicts of interest	24	
25		Describe any potential for conflict of interest of study contributors in accordance with journal policy. In the absence of a journal policy, we recommend authors comply with International Committee of Medical Journal Editors recommendations.	
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For consistency, the CHEERS Statement checklist format is based on the format of the CONSORT statement checklist

The **ISPOR CHEERS Task Force Report** provides examples and further discussion of the 24-item CHEERS Checklist and the CHEERS Statement. It may be accessed via the *Value in Health* link or via the ISPOR Health Economic Evaluation Publication Guidelines – CHEERS: Good Reporting Practices webpage: <http://www.ispor.org/TaskForces/EconomicPubGuidelines.asp>

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# BMJ Open

## A retrospective review of gender-based salary differences in academic medicine among six public medical centers in the western United States

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<b>Primary Subject Heading</b>:	Medical education and training
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Keywords:	MEDICAL EDUCATION & TRAINING, HEALTH ECONOMICS, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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1 **TITLE:** A retrospective review of gender-based salary differences in academic medicine among  
2 six public medical centers in the western United States

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27  
28  
29 Key Words: Academic medicine, gender inequity, income gap, equity

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34

## 35 Abstract

36 **Objectives:** We sought to evaluate differences in salary based on gender, rank and research  
37 productivity among faculty at academic medical centers to better understand the origin of  
38 disparities in salary.

39 **Design:** A retrospective review of salary for assistant, associate, and full professors during the  
40 year of 2016.

41 **Setting:** Faculty from six state-run, publicly funded academic medical centers in the western  
42 United States.

43 **Participants:** Participants included 799 total faculty members, including 225 assistant (51%  
44 women), 200 associate (40% women), and 374 full professors (32% women) from General  
45 Surgery (26% women), ObGyn (70% women), and Radiology departments (34% women).

46 **Interventions:** Archived online faculty profiles were reviewed to collect information on gender,  
47 total compensation, baseline compensation, supplemental income, and rank. Elsevier's SCOPUS  
48 was used to collect data on h-index, a measure of research productivity.

49 **Primary and secondary outcome measures:** The primary objective of our study was to identify  
50 where in total compensation the salary gap originates by evaluating differences in salary based  
51 on gender, rank and research productivity for three academic medical specialties. Linear  
52 regression models were estimated to determine the relationship between these factors and salary.

53 **Results:** Total compensation was significantly higher for men across all professorial ranks in  
54 both General Surgery and ObGyn. Women faculty within these departments earned almost  
55 \$75,000 less than their men colleagues. The disparity in salary originates from gaps in  
56 supplemental income, as baseline compensation was not significantly different between men and  
57 women. No significant gender difference in total compensation for Radiology was found. Higher



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3 58 h-index was associated with higher baseline compensation across all departments as well as with  
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5 59 supplemental income for General Surgery. Higher h-index was related to lower supplemental  
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8 60 income for Radiology and was not related to supplemental income for ObGyn.  
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10 61 **Conclusions:** Further investigations should focus on discrepancies in supplemental income  
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12 62 which may preferentially benefit men.  
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#### 16 17 64 Strengths and limitations of the study

- 18  
19 65 • This is a large population study assessing distribution of salary among three diverse  
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21 66 disciplines based on their gender distributions and distribution of the types of clinical  
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23  
24 67 work.
- 25  
26 68 • Linear regression models were estimated to determine the relationship between specialty,  
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28 69 gender, rank, h-index and salary.
- 29  
30 70 • We focus on only one set of state-based academic institutions from the west coast of the  
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32 71 United States and so are unable to be certain whether our findings would generalize to  
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34 72 private practices or to those in other parts of the country.
- 35  
36 73 • We examined salaries from only three departments and therefore cannot be certain that  
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38 74 other clinical specialties would follow similar patterns.
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40 75 • Our data was obtained from websites only, we are unable to delve more deeply into the  
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42 76 components of supplemental income beyond the general description that is offered  
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## 81 Introduction

82 The more education a woman has, the greater the gender disparity in salary is seen.<sup>1</sup> This  
83 disparity is especially glaring for physicians and surgeons, with women earning about 74 cents  
84 for every dollar men earn.<sup>2</sup> Representation of women in medicine is increasing dramatically,  
85 however the gender salary gap remains.<sup>3-4</sup> Women faculty have been shown to have lower  
86 salaries, smaller start-up packages, and limited authorship roles.<sup>3-13</sup> Despite the Equal Pay Act of  
87 1963, this gap continues to exist across specialties, practice settings, work hours, and other  
88 characteristics,<sup>6-10</sup> and persists even after accounting for age, experience, specialty, faculty rank,  
89 and measures of research productivity and clinical revenue.<sup>6-13</sup> Commonly cited explanations for  
90 this gender disparity in salary include differences in negotiating skills, opportunities to join  
91 networks of influence within organizations, discrimination, and implicit and explicit bias.<sup>6,7,10,14-  
92 16</sup>

93  
94 There is an increasingly large body of evidence that gender not only impacts salary but also  
95 faculty rank and research productivity.<sup>6-13</sup> Gender disparities in faculty rank within academic  
96 medicine persist after accounting for age, years since completion of residency, specialty,  
97 scientific authorship, National Institutes of Health (NIH) research funding, clinical trial  
98 participation, and clinical revenue.<sup>10</sup> In academic medicine specifically, there is a significant  
99 gender difference in number and impact of publications, with women showing lower  
100 productivity than men in surgical specialties.<sup>13</sup>

101  
102 In order to close the salary gap in academic medicine, we must be clear where in total  
103 compensation packages this disparity originates. Previous data as it relates to non-medical

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3 104 occupations suggests that gender differences in salary can be attributed to the salary gaps within  
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5 105 specific occupations, not across occupations.<sup>17</sup> As such, we chose to focus this study on  
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8 106 academic salary at a single time point, expecting to see differences in salary based on gender,  
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10 107 faculty rank and h-index, a metric for evaluating the cumulative impact of an author's scholarly  
11  
12 108 output and performance calculated by comparing number of publications to citations.<sup>18</sup> The  
13  
14 109 primary objective of our study was to identify where in total compensation the salary gap  
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16 110 originates by evaluating differences in salary based on gender, rank and research productivity for  
17  
18 111 three diverse academic medical specialties. Our areas of interest – salary, academic rank, and  
19  
20 112 research productivity – are typical benchmarks for professional development.<sup>6-11,18,19</sup> We  
21  
22 113 hypothesized that women would earn significantly less total compensation across all ranks, even  
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24 114 after accounting for rank and research productivity.  
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## 31 **Methods**

### 32 **Study Design**

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34 117 This was a retrospective population study of total faculty compensation for assistant, associate,  
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36 118 and full professors at six major public academic medical centers using a single time point during  
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38 119 2016. We chose the time point of 2016 as it was the most recent year for which data was  
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40 120 available at the time. Three diverse disciplines were examined: general surgery, obstetrics &  
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42 121 gynecology, and radiology. Three diverse specialties – general surgery, obstetrics and  
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44 122 gynecology, and radiology - were chosen, primarily because of their gender distributions and  
45  
46 123 distribution of the types of clinical work.<sup>8,20-25</sup> General surgery and radiology are male-dominated  
47  
48 124 specialties, while obstetrics and gynecology is a female-dominated specialty.<sup>20-25</sup> There is also a  
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50 125 diversity of clinical work throughout these three subspecialties with general surgery being  
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3 127 dominated by surgical procedures, radiology not being surgical in nature, and obstetrics and  
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5 128 gynecology with a more diverse balance of clinical work.<sup>3,8,20-26</sup> Ethics approval and consent to  
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7  
8 129 participate was waived by the Institutional Review Board of the Stanford University School of  
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10 130 Medicine.

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12 131

### 13 132 **Study Population**

14  
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17 133 Archived online faculty profiles were reviewed to collect information on gender. Trained  
18  
19 134 research staff utilized the internet archive service Wayback Machine<sup>26</sup> to collect data on gender  
20  
21 135 from 2016 online faculty profiles at each department's website. Gender was identified on faculty  
22  
23 136 profile by identifying the pronoun included on faculty profile. In the occasion that the pronoun  
24  
25 137 was not specifically stated, the research staff used faculty photo and name to identify gender.  
26  
27 138 Faculty from six academic institutions were included. We were able to stratify by assistant,  
28  
29 139 associate, or full professor faculty rank.  
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### 34 141 **Patient and Public Involvement**

35  
36 142 There was no patient or public involvement.  
37  
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### 41 144 **Total Compensation, Rank and Research Productivity**

42  
43  
44 145 A publicly available database which contains all of the compensation information for faculty and  
45  
46 146 employees at a large university system was used to look at total faculty compensation in three  
47  
48 147 different ways: Total compensation, baseline compensation, and supplemental income.<sup>27</sup> Total  
49  
50 148 compensation was defined as baseline compensation plus supplemental income. Baseline  
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52 149 compensation was defined as base salary minus reductions due to participation in the voluntary  
53  
54 150 Employee Reduction in Time and phased retirement programs. Supplemental income (commonly

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3 151 referred to as “discretionary pay”) was defined as negotiated additional salary for clinical care  
4  
5 152 and research which was funded from earned clinical revenue as well as contracts and grants. This  
6  
7 153 includes: pay for Summer Session or University Extension teaching, pay for research performed  
8  
9 154 during summer months that is funded by extramural contracts and grants, performance-based  
10  
11 155 incentive compensation and similar payments that recognize achievement of specific  
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13 156 performance goals or exemplary service, pay for shift differentials (e.g., night or holiday call),  
14  
15 157 payout of unused vacation leave upon separation, and lump sum payments made as part of the  
16  
17 158 settlement of union bargaining agreements. Data on academic rank and specialty was collected  
18  
19 159 from the same database. Elsevier's SCOPUS was used to collect data on h-index. Faculty  
20  
21 160 members' h-indexes were obtained using their full name, last name and first and middle initials,  
22  
23 161 and/or maiden name when appropriate. (Supplementary Table)  
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### 31 **Statistical Analysis**

32  
33 164 Our data set consisted of 6 variables: (1) Department – a three-level categorical variable  
34  
35 165 (surgery, obstetrics & gynecology, and radiology); (2) Rank - three-level categorical variables  
36  
37 166 (assistant, associate, and full); (3) Gender; (4) h-index – a measure of publication output; (5)  
38  
39 167 baseline compensation – i.e. salary; and (6) supplemental income – e.g. bonuses, income for  
40  
41 168 extra work. Linear regression models were estimated to determine the relationship between these  
42  
43 169 factors and salary. Compensation was selected as our primary variable and gender, academic  
44  
45 170 rank and h-index as secondary variables. Rank, gender, and h-index were treated as independent  
46  
47 171 variables, whereas “baseline compensation” and “supplemental income” were treated as  
48  
49 172 dependent variables. Because rank is a three-level categorical level, it was split into two dummy  
50  
51 173 variables with “Full” as reference value. Three regression models were run per department: one  
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174 to predict total compensation (baseline compensation plus supplemental income), one to predict  
175 baseline compensation, and one to predict supplemental income. Data was entered into SPSS  
176 version 20, with a  $p$  value of less than 0.05 considered to be significant.

177

## 178 Results

179 988 total employees were assessed for eligibility (see **Figure 1**). 110 (11%) were excluded for  
180 having a role other than assistant, associate, or full professor. A further 79 (8%) were excluded  
181 because they were listed on the department website but not in the payroll database. After  
182 exclusions, our analysis included 799 faculty members, 312 (39%) were identified as women and  
183 487 (61%) were identified as men and distribution among ranks included 225 (28%) assistant,  
184 200 (25%) associate, and 374 (47%) full professors (**Table 1**).

185

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

192

### 193 General Surgery

194 Distribution of salary for general surgery is presented in **Figure 3**. Within general surgery, the  
195 overall regression for total compensation was significant ( $R^2 = .159$ ,  $F(4, 299)$   
196  $= 14.123$ ,  $p < .01$ ). This means that, when they are examined together, the independent

197 variables of gender, rank, and h-index influence the dependent variable of total compensation.

198 Looking specifically at the three independent variables, we found that: Gender was significantly  
199 different with women earning lower total compensation than men ( $\beta = -84,970, p < 0.05$ ).

200 Rank was not significantly different for total compensation. Higher h-index was significantly  
201 associated with higher total compensation ( $\beta = 5,023, p < 0.01$ ).

202  
203 In an attempt to analyze what specifically drove the effect on total compensation, we ran separate  
204 analyses on “baseline compensation” and “supplemental income” separately. In terms of baseline  
205 compensation, the overall regression was significant ( $R^2 = 0.323, F(4, 299)$   
206  $= 35.737, p < 0.01$ ). Again, these analyses took into account the combined effect of all three  
207 independent variables of gender, rank, and h-index on baseline compensation. Looking  
208 specifically at each variable within the regression: Gender was not significantly associated with  
209 baseline compensation with men and women receiving similar baseline compensation. Rank was  
210 associated with regular salary, with assistant professors ( $\beta = -51,031, p < .01$ ) and associate  
211 professors ( $\beta = -40,680, p < 0.01$ ) earning significantly less baseline compensation than full  
212 professors. Higher h-index was also significantly associated with higher baseline compensation (  
213  $\beta = 1,606, p < .01$ ).

214  
215 For “supplemental income”, the overall regression was significant, again examining the  
216 combined effect of gender, rank, and h-index, was significant ( $R^2 = 0.096, F(4,299)$   
217  $= 7.900, p < 0.01$ ). In terms of specific variables: Gender was significantly associated with  
218 supplemental income ( $\beta = -79,467, p < 0.05$ ) with women earning significantly less of this

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

221

## 222 **Obstetrics and Gynecology**

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

230

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

238

239 For supplemental income, the overall regression of the combined effect of gender, rank, and h-  
240 index was not significant ( $R^2 = .037, F(4, 174) = 1.666, n.s.$ ). However, when we looked at  
241 the three variables specifically within the regression, there was a significant difference in gender,



242 with women earning less supplemental income than men ( $\beta = -74,168, p < 0.05$ ). There were  
243 no significant differences in supplemental income for the variables of rank or h-index.

## 245 Radiology

246 Distribution of salary for radiology is presented in **Figure 5**. Within radiology, the overall  
247 regression, which again examined the combined effect of gender, rank, and h-index for total  
248 compensation was not significant ( $R^2 = 0.01, F(4,266) = .591, n.s.$ ). Furthermore, none of the  
249 individual variables of gender, rank, or h-index showed any significant association with total  
250 compensation.

251 In terms of baseline compensation, the overall regression, which again included the combined  
252 effect of gender, rank, and h-index, was significant ( $R^2 = 0.395, F(4,265) = 43.293, p < 0.01$   
253 ). For the specific variables: Gender was not significantly associated with baseline compensation  
254 as men and women earned similar base compensation. Significant differences in baseline  
255 compensation by rank were identified with assistant professors ( $\beta = -52,145, p < 0.01$ ) and  
256 associate professors ( $\beta = -43,848, p < 0.01$ ) earning significantly lower baseline  
257 compensation than full professors. Higher h-index was also significantly associated with higher  
258 baseline compensation ( $\beta = 979, p < 0.01$ ).

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



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## 266 Discussion

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

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282 Previous studies offer many theories to explain the gender gap, including women are less likely  
283 to be asked to serve as leaders, experience effective mentoring, receive equitable allocation of  
284 research funding, and seek additional call hours or clinical work in favor of different household  
285 and childrearing obligations.<sup>3,29-35</sup> Women faculty who work flexible hours may be less likely  
286 than men to receive leadership positions that result in bonus salary.<sup>29</sup> In fact, faculty who need a  
287 more flexible work schedule remain as junior faculty and receive less support.<sup>30</sup> These

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3 288 circumstances help to explain our findings the lower “additional” or supplemental income for  
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5 289 women faculty within the two specialties. One solution is to alter promotion policies to better  
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8 290 support the diversity of needs.<sup>30</sup> Additional solutions can be found in the NIH’s Gender  
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10 291 Inequality Task Force Report.<sup>31</sup>

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14 293 Interestingly, the gender gap for supplemental income in our study was true within obstetrics and  
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16 294 gynecology, despite the fact that women comprise a majority of faculty members within this  
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19 295 specialty. Furthermore, no gender gap was identified for the department of radiology, despite its  
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21 296 male predominance. This finding suggests that the gender distribution of the department alone  
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24 297 does not necessarily guide salary discrepancies between women and men faculty members.  
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26 298 Instead, it seems that other factors, such as the nature of the clinical work itself, may contribute  
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28 299 to the gender salary gap.<sup>31</sup> It has been acknowledged in previous studies that surgical  
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31 300 subspecialties are highly technical and predominantly occupied by men, and often times men are  
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33 301 among the highest paid with roles as researchers, opposed to women within these specialties  
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35 302 occupying lower status communal roles as educators.<sup>34</sup> For instance, no gender differences were  
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38 303 noted for any portion of salary within the radiology departments which we examined in this  
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40 304 study. Radiology clinical work differs from that of other specialties in that it is predominantly  
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42 305 shift-based and less procedural than general surgery and obstetrics and gynecology. Radiology  
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44 306 may thereby offer fewer opportunities for gender-based increases to supplemental income which  
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47 307 might be earned through additional clinical work.

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51 309 Our findings also validate previous studies finding striking gender inequities in the higher  
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54 310 academic ranks.<sup>13</sup> Common explanations for these gender differences include the gender-based

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3 311 hiring disparities of previous generations, lack of transparency of salary, promotion, mentoring  
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5 312 and female role-models, and time away for childbearing and family obligations.<sup>14,15,29,30,33</sup> There  
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7 313 is also recent evidence that women physicians might start their career with lower salary  
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9 314 expectations than men, which could become a self-fulfilling prophecy for later salary.<sup>30,34</sup>  
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11 315 Furthermore, there is some indication that women prioritize salary less than men do and are  
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13 316 judged more harshly for initiating negotiations.<sup>6,14,15, 30</sup>  
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19 318 In summary, gender disparities have been well documented in academic medicine, and our study  
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21 319 offers a unique perspective of the different components that make up the academic medicine  
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23 320 physician salary. Previous studies have offered suggestions to improve this disparity, which will  
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25 321 be important for closing this supplemental income gap. Suggestions include transparency of  
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27 322 starting salaries to young professionals, initiating negotiation training to improve starting salary  
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29 323 packages, mentorship in career advancement for women junior faculty, investigation of research  
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31 324 grant award processes, and further adoption of programs to address disparities in grant award  
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33 325 processes.<sup>31</sup> Implementation of a university-wide objective compensation planned implemented  
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35 326 by the Association of American Medical Colleges regional median salary (AAMC-WRMS) was  
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37 327 associated with reduced gender-based differences in salary among surgery faculty within the  
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39 328 institution and a statistically significant increase in salary among female faculty. Objective  
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41 329 compensation plans may mitigate gender-based implicit bias in salary negotiations and  
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43 330 promotions.<sup>35</sup>  
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## 51 332 **Limitations**

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3 333 Our study has several limitations. First, we focus on only one set of state-based academic  
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5 334 institutions from the west coast of the United States and so are unable to be certain whether our  
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7 335 findings would generalize to private practices or to those in other parts of the country.  
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10 336 Furthermore, we examined salaries from only three departments and therefore cannot be certain  
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12 337 that other clinical specialties would follow similar patterns. However, the departments were  
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14 338 chosen to accurately reflect a set of departments with a diverse set of gender distribution and  
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16 339 clinical work. Finally, since our data was obtained from websites only, we are unable to delve  
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18 340 more deeply into the components of supplemental income salary beyond the general description  
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20 341 that is offered publicly. We are therefore not able to completely explain what aspect of  
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22 342 compensation supplemental incomes represents or why it is not related to academic productivity  
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24 343 in the same way across the three departments. The 2016 data may not reflect more contemporary  
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26 344 remuneration, however, based on salary disparity trends, we do not anticipate the salary gap  
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28 345 narrowing since the study time period. Additionally, during the study period, gender pronouns  
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30 346 were included in the majority of faculty profiles, however, were not available on a limited  
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32 347 number of the included study population profiles. For faculty members who did not include  
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34 348 gender pronouns, we were limited to faculty name and profile photo and a trained research staff  
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36 349 member selected the assumed gender. Additionally, we did not have granular data to distinguish  
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38 350 non-binary and gender expansive people. We recognize that diversity and equity is of utmost  
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40 351 importance in all underrepresented populations. Further research is warranted on the impact of  
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42 352 other variables such as race, ethnicity, and LGBTQ+ people.  
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## 51 **Conclusion**

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3 355 In sum, our study observed the trends of salary within three clinical specialties at state-run,  
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5 356 publicly funded academic institutions. For this sample, gender differences were most notable in  
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7 357 the fields of general surgery and obstetrics and gynecology. We suggest that further  
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10 358 investigations should focus less on gender inequities of base salary, which may not be relevant to  
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12 359 clinical faculty in academic settings as they are institutionally set to be independent of gender,  
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14 360 and more on discrepancies in discretionary or supplemental income which may preferentially  
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16 361 benefit men. With closer analysis, we might be able to achieve a better understanding of whether  
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18 362 women are not receiving their full earning potential or, as has been suggested in the economic  
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20 363 literature,<sup>28,36</sup> whether they are instead prioritizing flexibility in work hours over compensation.  
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22 364 Finally, with our observation that the gender salary gap might not be as prominent within the  
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24 365 field of radiology, additional studies of this specialty could identify ways in which it could serve  
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26 366 as a model for gender-based salary structures for clinicians.  
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378 **Table 1.** Demographic data for women and men faculty by institution and department at six  
 379 academic institutions in 2016.

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

380 <sup>1</sup>Women; <sup>2</sup>Men

381 <sup>3</sup>Institution 4 did not have a surgery or radiology department.

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

<i>Department</i>	<i>Rank</i>	<i>Gender</i>	<i>Total</i>	<i>Total Compensation (Mean ± SD)</i>	<i>Baseline Compensation (Mean ± SD)</i>	<i>Supplemental Income (Mean ± SD)</i>	
<i>General Surgery</i>	Assistant	W <sup>1</sup>	58	325,154 ± 167,202	100,013±21,259	<b>225,141±165,366</b>	
		M <sup>2</sup>	9	401,248 ± 211,949	102,668±10,160	<b>298,580±215,319</b>	
	Associate	W	27	321,560 ±137,854	127,005±28,489	<b>194,556±129,298</b>	
		M	9	463,437 ±209,438	118,118±7,564	<b>345,320±211,383</b>	
<i>Ob/Gyn</i>	Professor	W	41	355,631±135,205	160,583±40,006	<b>195,048±114,816</b>	
		M	36	431,458±265,881	193,647±70,290	<b>237,811±235,410</b>	
	Assistant	W	31	272,521±117,227	106,264±27,706	<b>166,257±97,851</b>	
		M	58	306,085±108,154	111,412±26,998	<b>194,673±89,110</b>	
<i>Radiology</i>	Associate	W	26	306,375±117,688	128,085±27,904	<b>178,291±97,833</b>	
		M	48	318,068±138,353	128,023±34,574	<b>190,045±114,220</b>	
	Professor	W	49	349,216±121,677	189,281±61,148	<b>160,329±90,079</b>	
		M	102	330,763±155,221	190,616±65,553	<b>140,147±122,192</b>	
	Assistant	W	26	271,733±101,797	116,400±32,331	<b>155,333±78,648</b>	
		M	43	317,801±180,669	116,310±45,245	<b>201,492±149,107</b>	
		Associate	W	26	334,010±192,702	129,735±46,725	<b>204,274±167,891</b>
		M	64	439,549±272,289	142,086±53,949	<b>297,463±250,756</b>	
Professor	W	28	432,943±221,201	196,264±65,213	<b>236,680±185,151</b>		
	M	118	552,015±365,815	207,686±88,078	<b>344,329±320,399</b>		

<sup>1</sup>Women; <sup>2</sup>Men

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3 412 **Author's contributions:** Hayley Miller was a major contributor in the writing of the manuscript.  
4  
5 413 Elizabeth Seckel analyzed and interpreted the data and contributed to manuscript preparation.  
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7 414 Chrislyn White performed data abstraction and collection. Diana Sanchez performed data  
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9 415 abstraction and collection. Erika Rubesova edited the manuscript. Claudia Mueller designed the  
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11 416 study, analyzed and interpreted the data and was a major contributor in writing of the  
12  
13 417 manuscript. Katherine Bianco designed the study, analyzed and interpreted the data and was a  
14  
15 418 major contributor in writing of the manuscript. All authors read and approved the final  
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17 419 manuscript.  
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32 425 interests.  
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37  
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42 430 **Data sharing statement:** All data is publicly available.  
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46 432 **Ethics approval and consent to participate** for this study was waived by the Institutional  
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48 433 Review Board of the Stanford University School of Medicine.  
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3 435 **Figure 1. Participant Exclusions.** Participants included 799 faculty members. 988 institution  
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5 436 employees were assessed for eligibility. 189 were excluded for having a non-professorial, full-  
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7 437 time role. A further 79 were excluded for only being listed on the department website, not being  
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9 438 on 2016 payroll.

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14 440 **Figure 2. Overall Salary.** Distribution of total compensation (A), baseline compensation (B)  
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16 441 and supplemental income (C) of women and men in general surgery, obstetrics and gynecology,  
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18 442 and radiology departments stratified by academic rank.

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25 445 **Figure 3. General Surgery Salary.** Distribution of total compensation (A), baseline  
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27 446 compensation (B) and supplemental income (C) of women and men in general surgery stratified  
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29 447 by academic rank.

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36 450 **Figure 4. Obstetrics and Gynecology Salary.** Distribution of total compensation (A), baseline  
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38 451 compensation (B) and supplemental income (C) of women and men in obstetrics and gynecology  
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40 452 stratified by academic rank.

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47 455 **Figure 5. Radiology Salary.** Distribution of total compensation (A), baseline compensation (B)  
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49 456 and supplemental income (C) of women and men in radiology stratified by academic rank.

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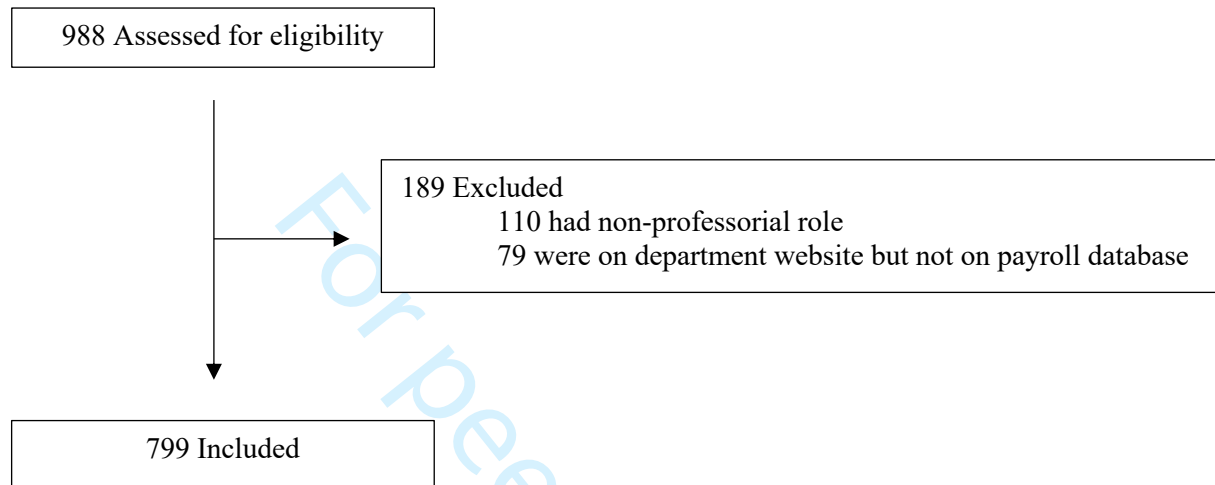
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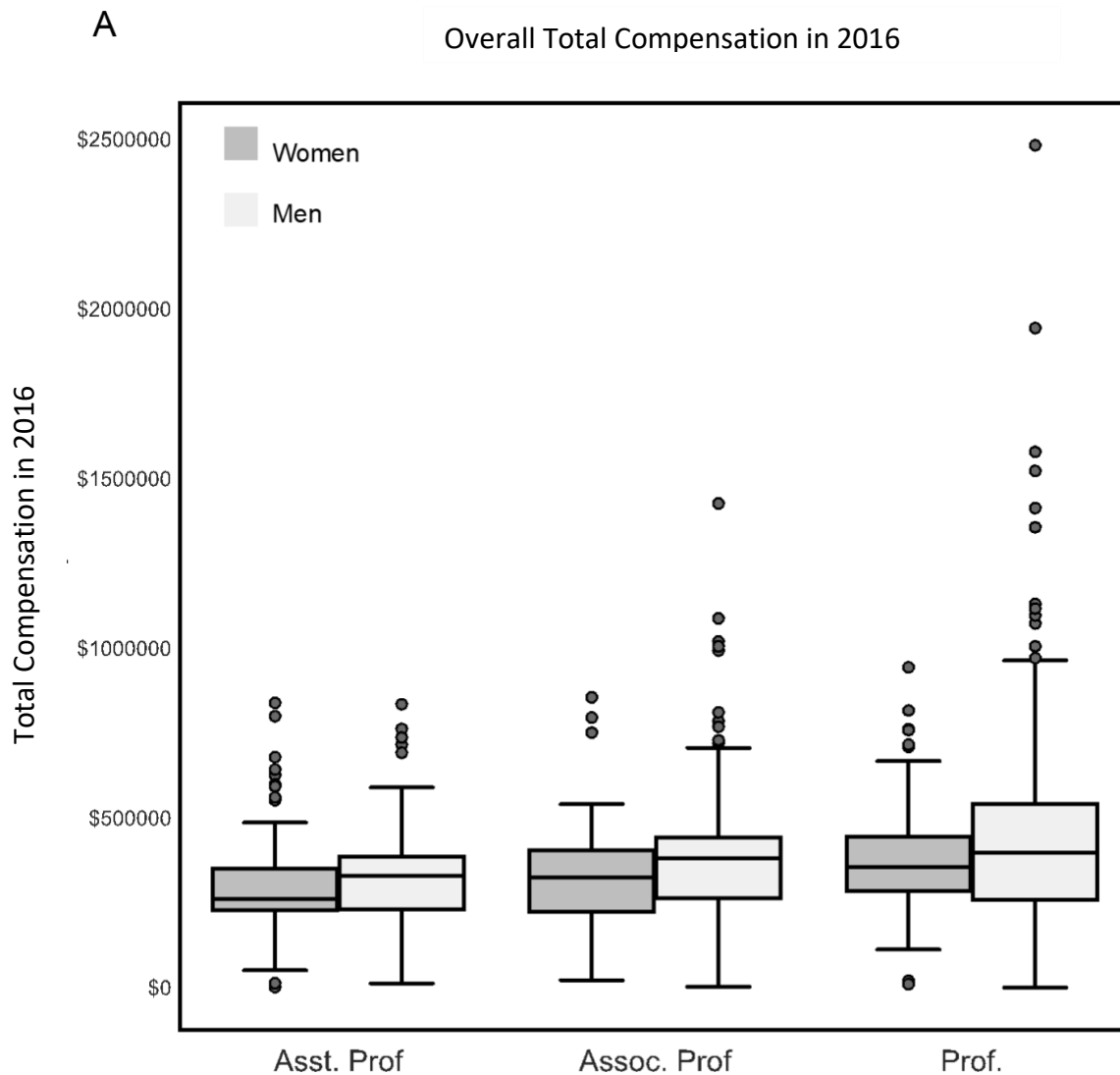
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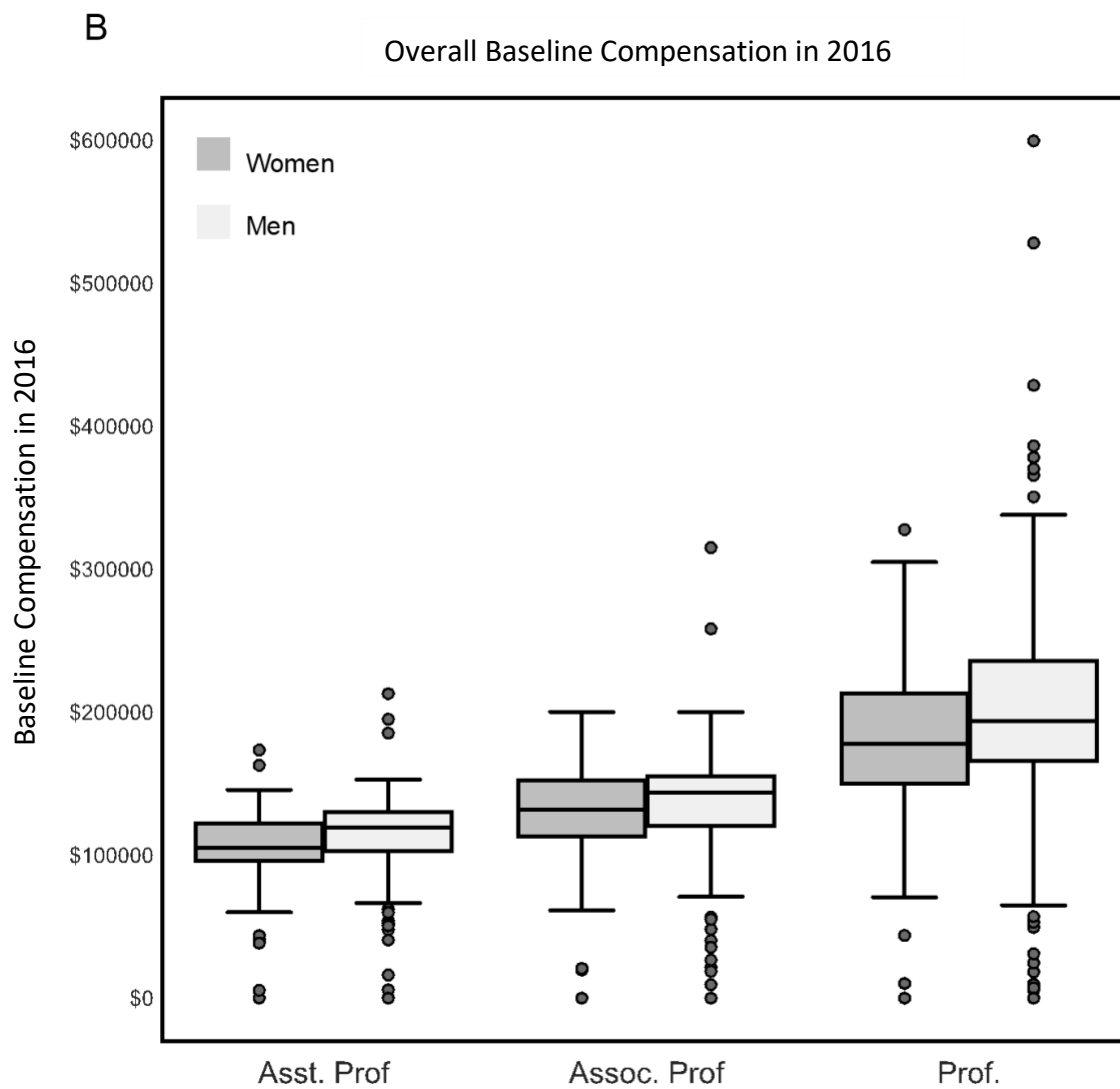
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**Figure 1. Participant Exclusions.** Participants included 799 faculty members. 988 institution employees were assessed for eligibility. 189 were excluded for having a non-professorial, full-time role. A further 79 were excluded for only being listed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



**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 gynecology, and radiology departments stratified by academic rank.



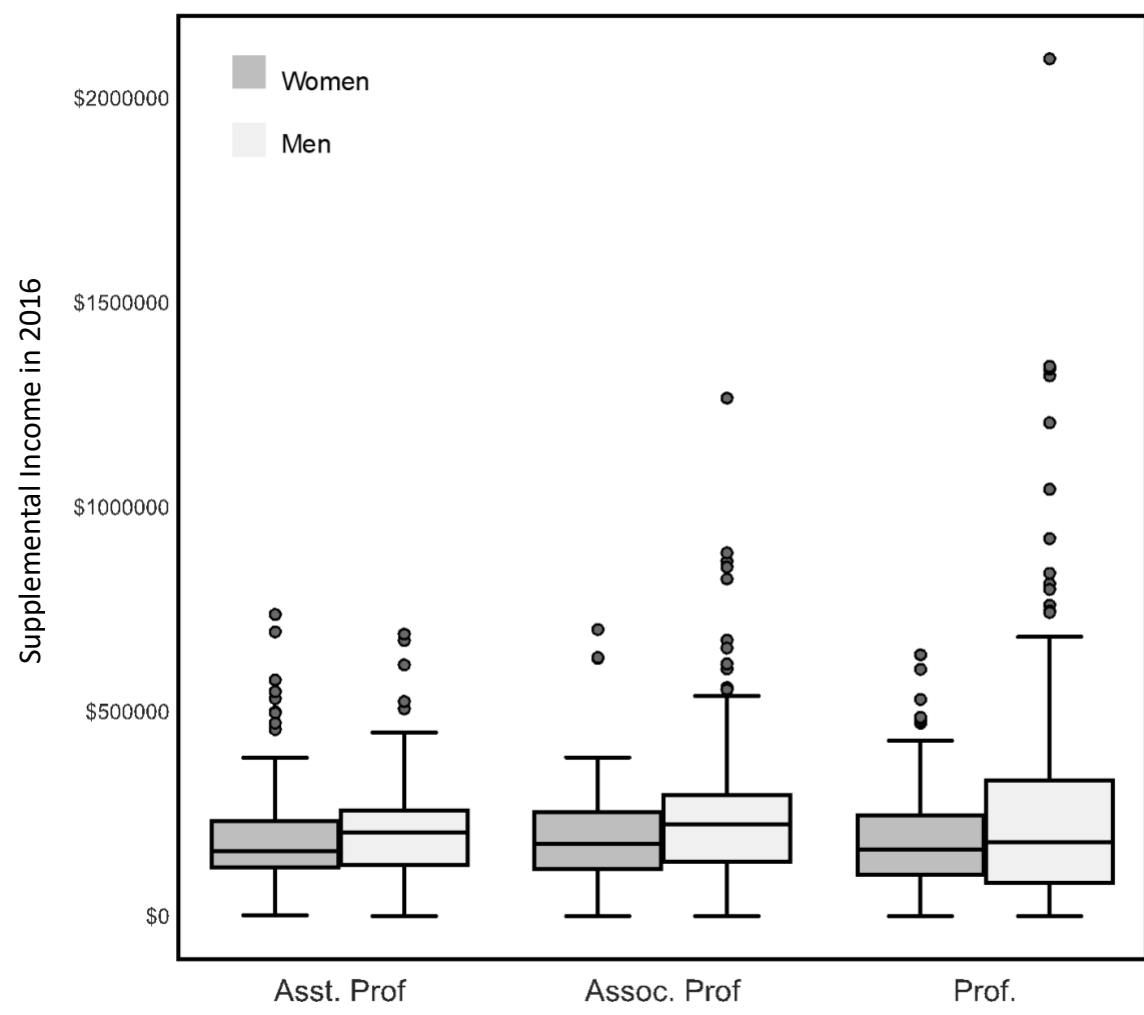


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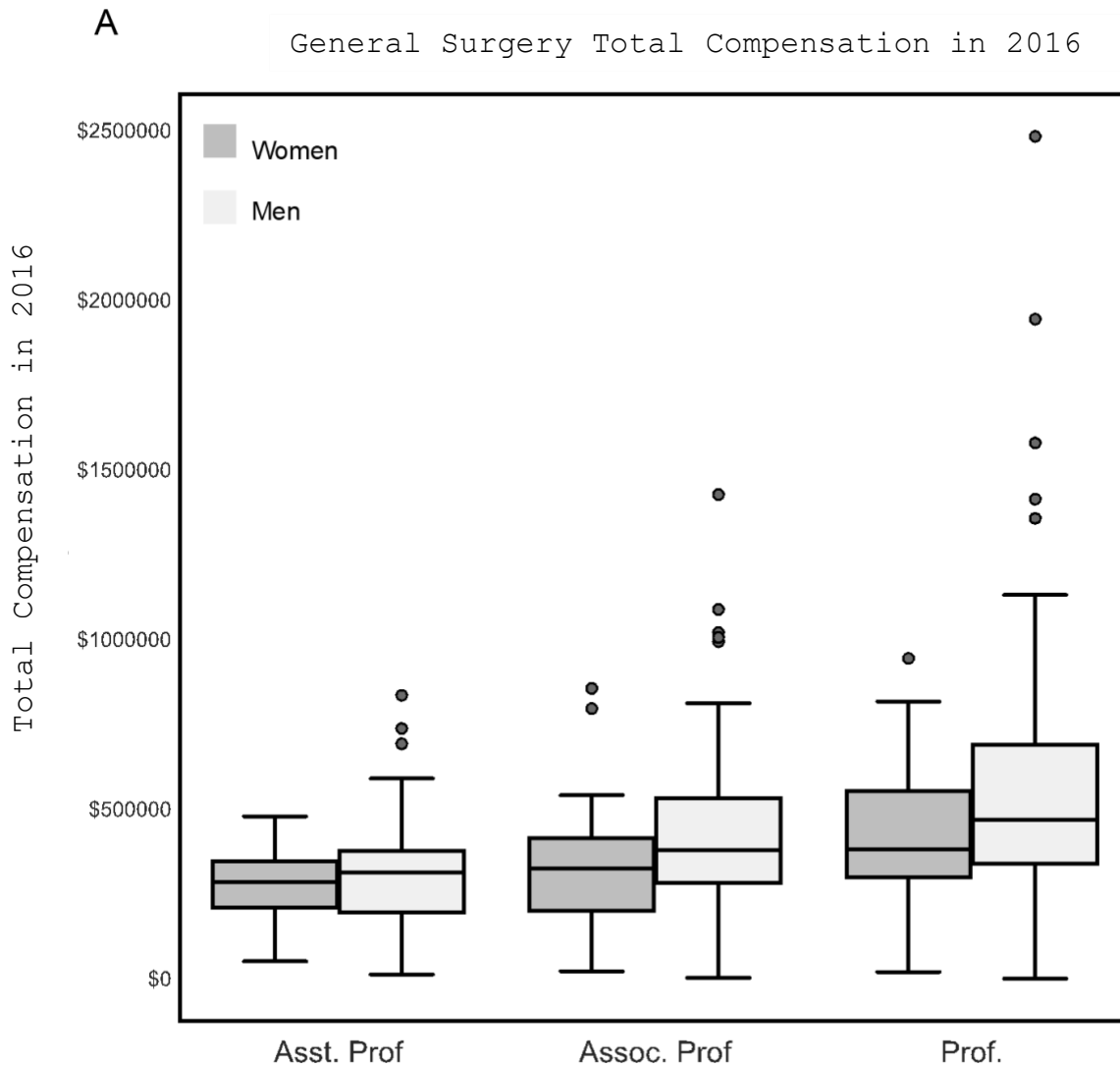
C Overall Supplemental Income in 2016



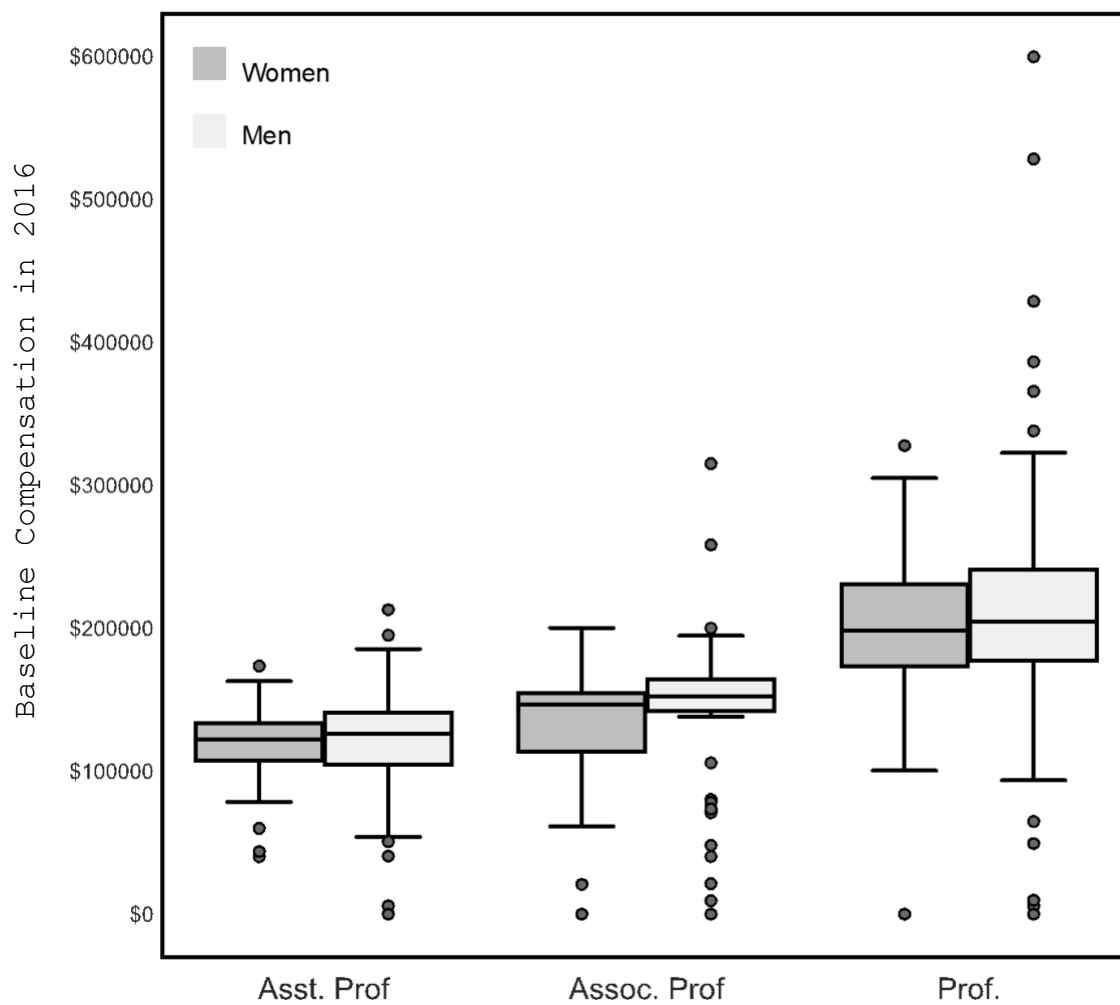
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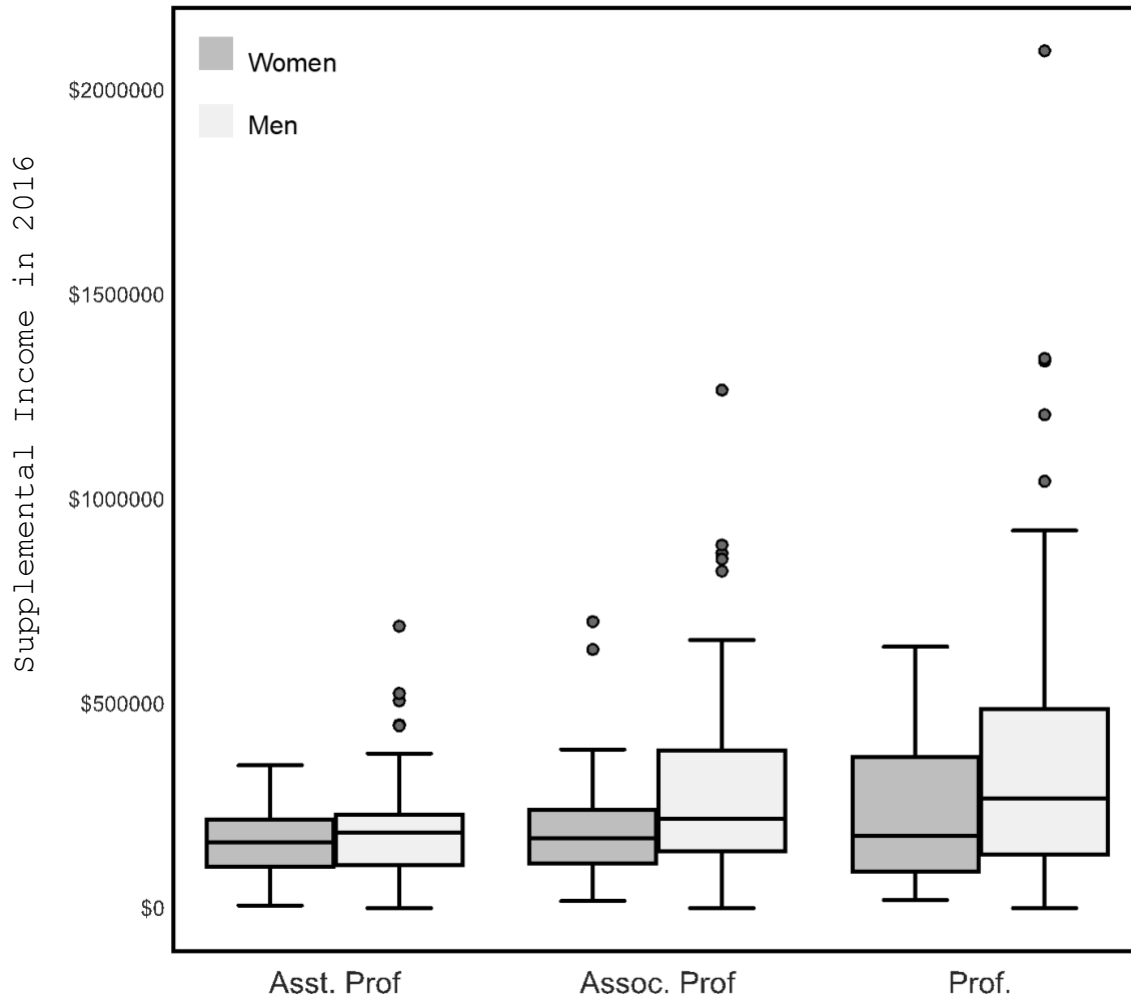
**Figure 3. General Surgery Salary.** Distribution of total compensation (A), baseline compensation (B) and supplemental income (C) of women and men in general surgery stratified by academic rank.



**B** General Surgery Baseline Compensation in 2016



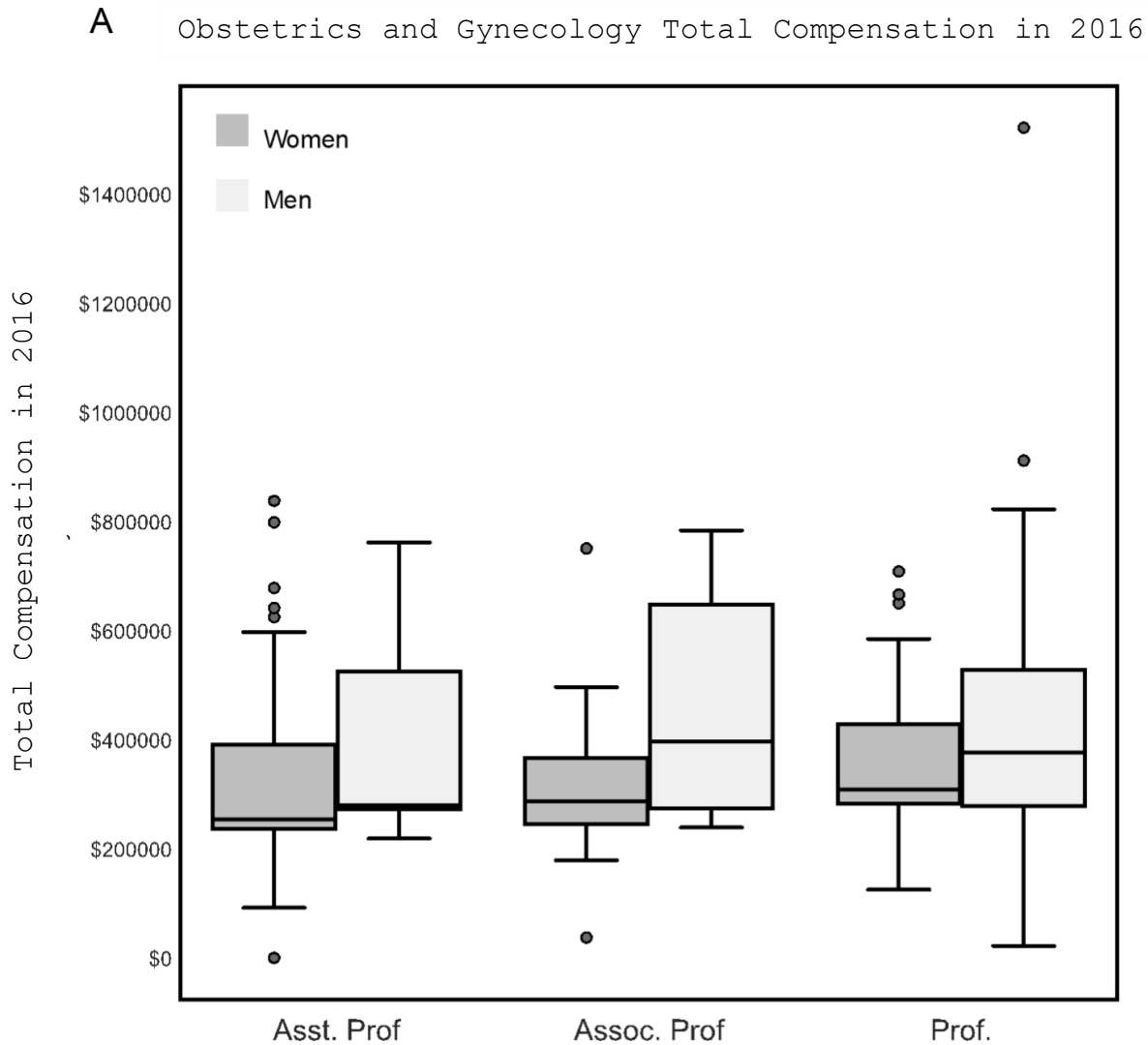
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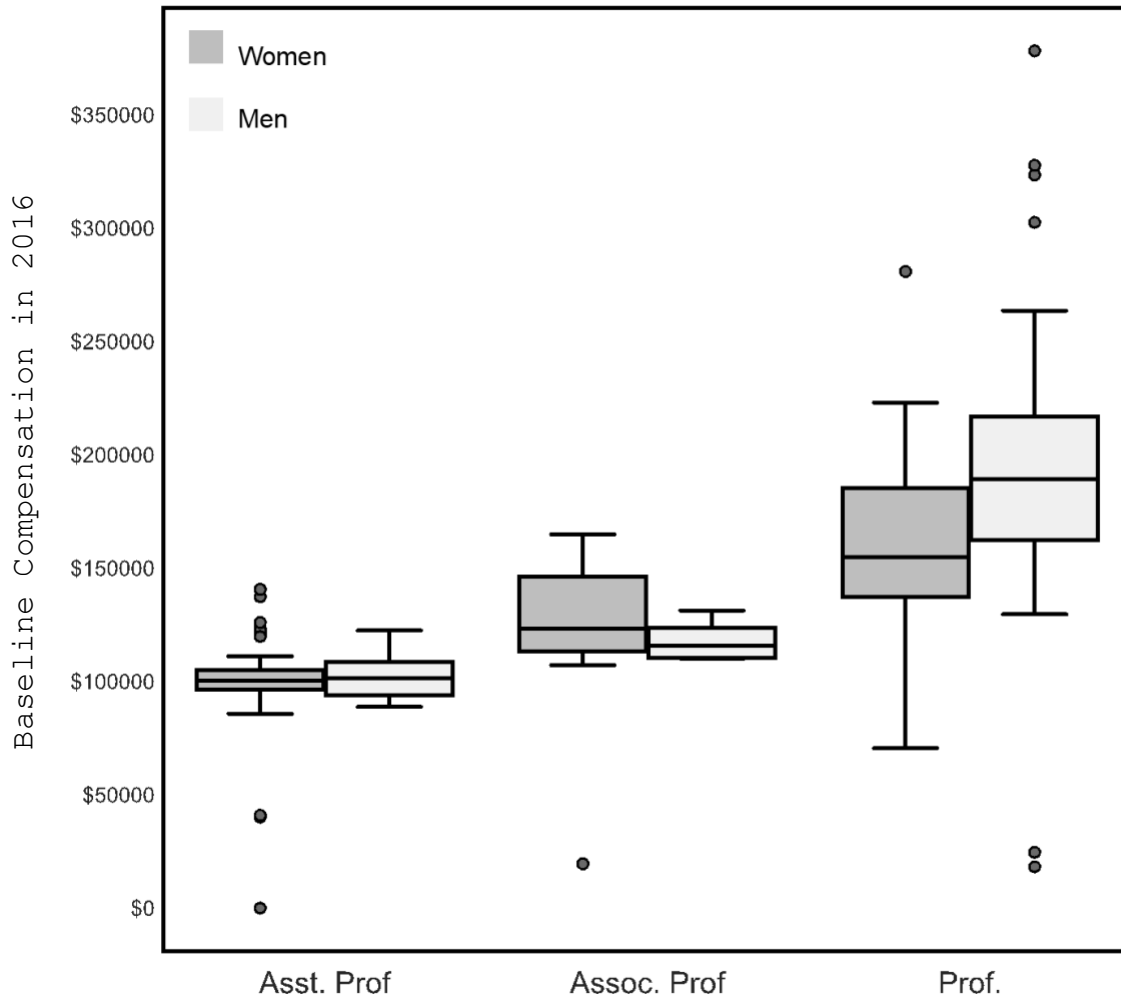
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**Figure 4. Obstetrics and Gynecology Salary.** Distribution of total compensation (A), baseline compensation (B) and supplemental income (C) of women and men in obstetrics and gynecology stratified by academic rank.

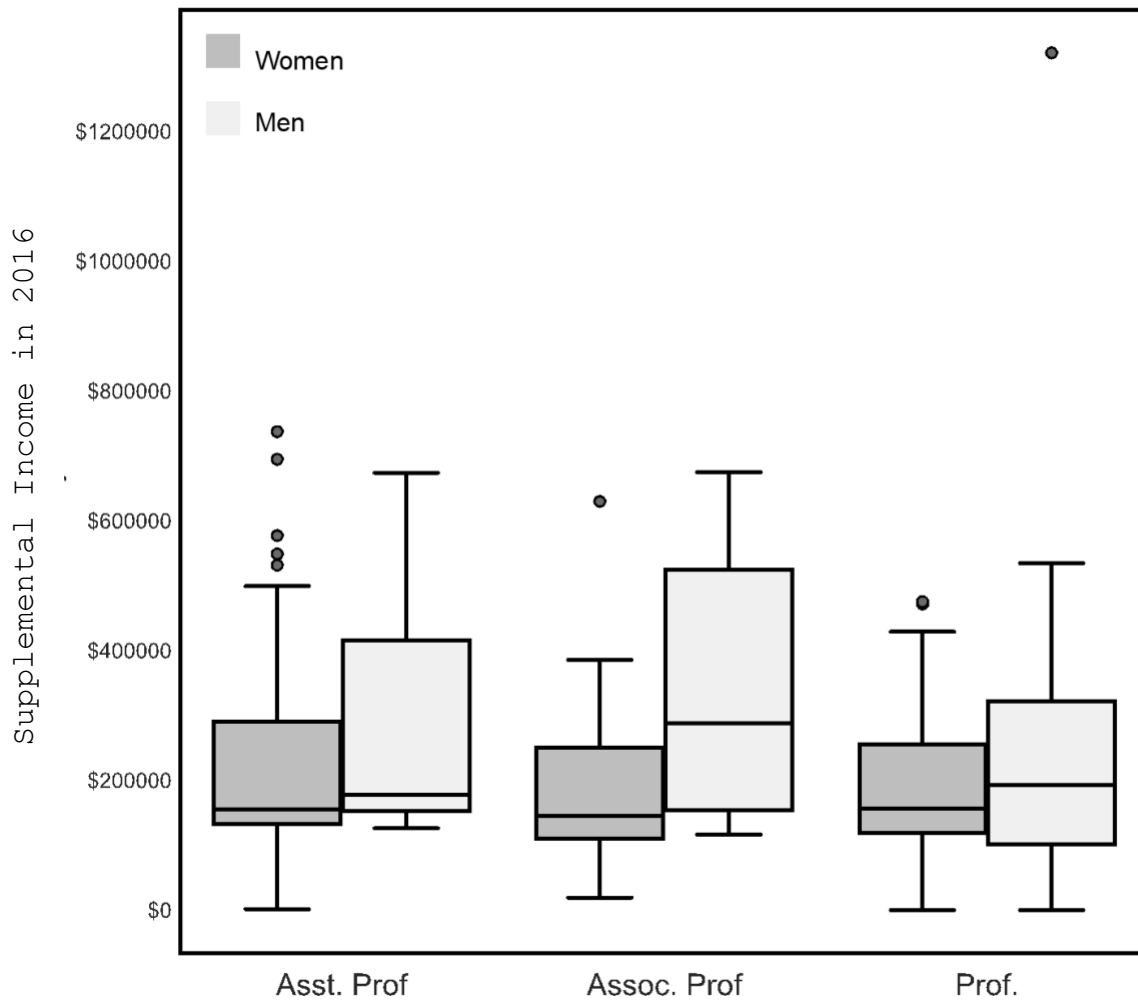


B Obstetrics and Gynecology Baseline Compensation in 2016





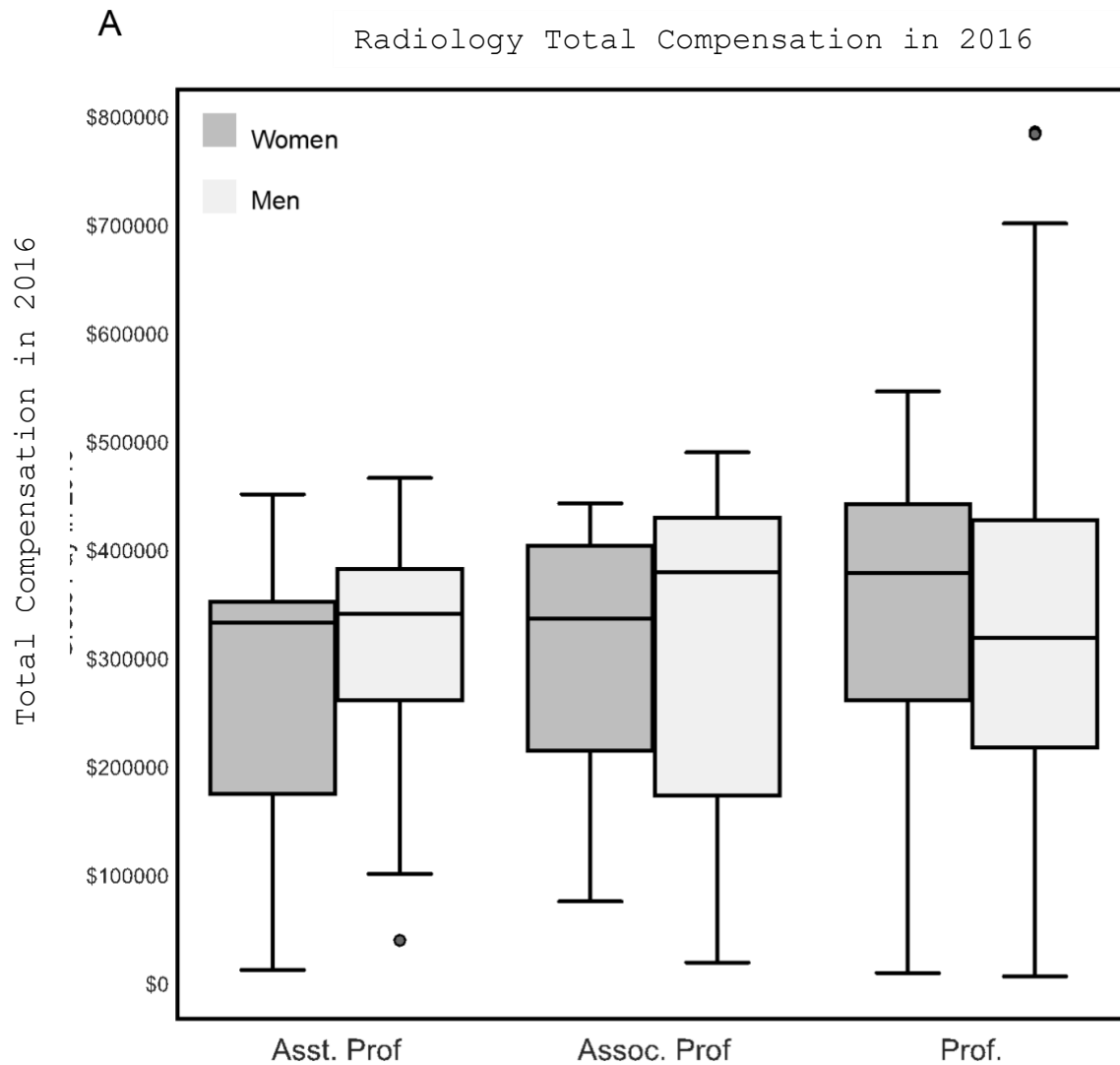
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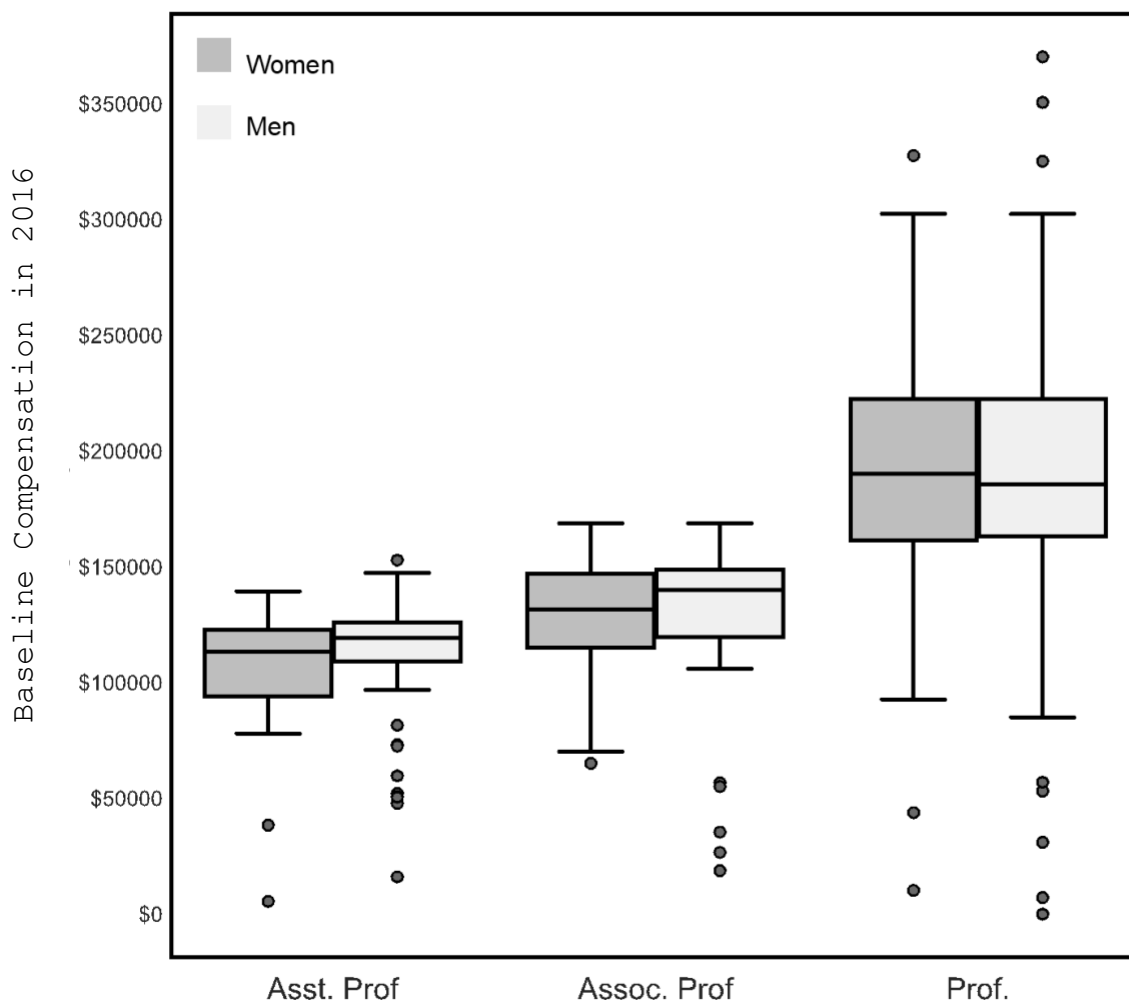
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**Figure 5. Radiology Salary.** Distribution of total compensation (A), baseline compensation (B) and supplemental income (C) of women and men in radiology stratified by academic rank.

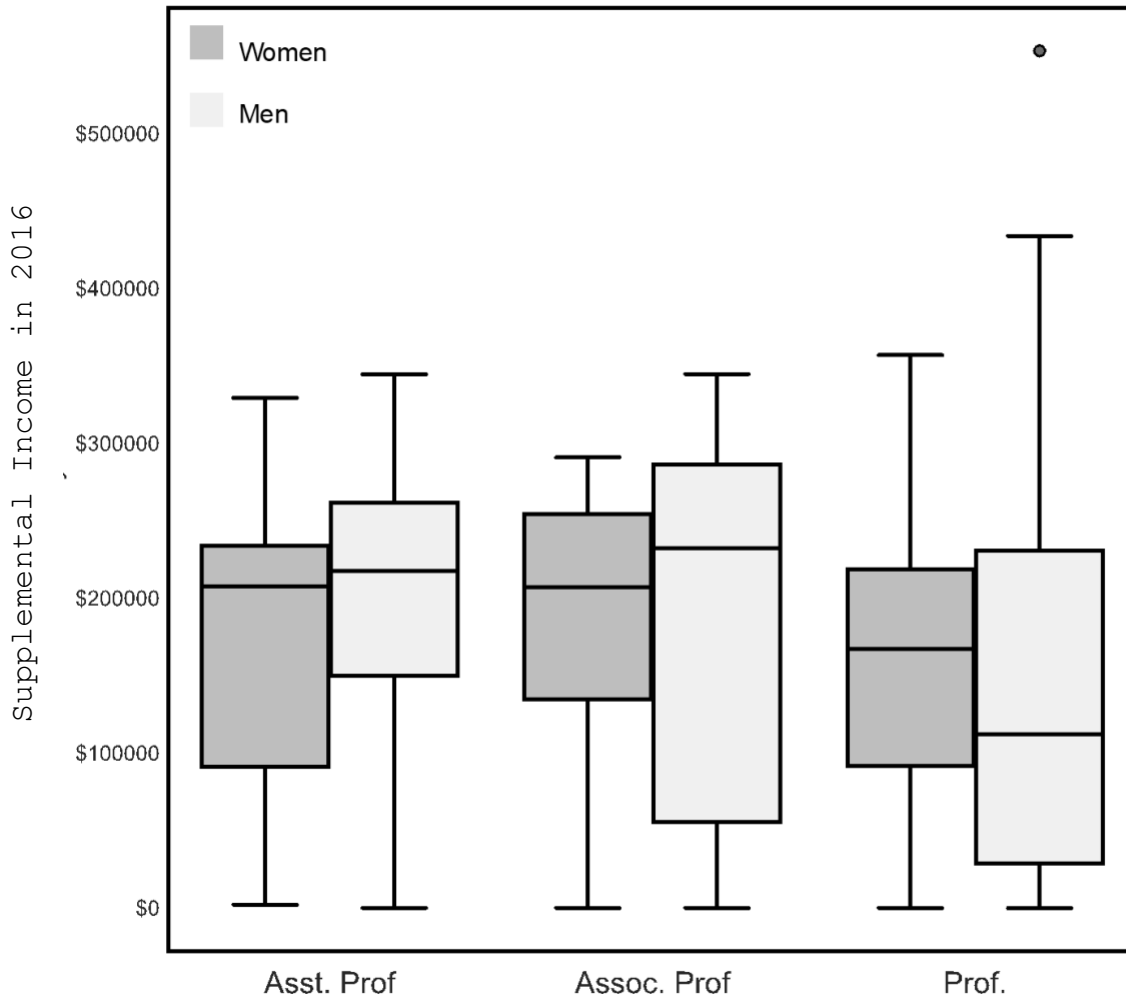


**B** Radiology Baseline Compensation in 2016



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## Supplementary Table

Department	Gender (W <sup>1</sup> , M <sup>2</sup> )		h-index
Ob/Gyn	W	Mean	7.67
		N	152
		Stand. Dev <sup>3</sup>	10.131
	M	Mean	17.32
		N	65
		Std. Dev	14.784
	Total	Mean	10.56
		N	217
		Std. Dev	12.496
Surgery	W	Mean	15.36
		N	94
		Std. Dev	14.366
	M	Mean	21.68
		N	269
		Std. Dev	17.358
	Total	Mean	20.04
		N	363
		Std. Dev	16.845
Radiology	W	Mean	17.86
		N	100
		Std. Dev	16.341
	M	Mean	22.55
		N	217
		Std. Dev	20.864
	Total	Mean	21.07
		N	317
		Std. Deviation	19.646
Total	W	Mean	12.71
		N	346
		Std. Deviation	14.070
	M	Mean	21.51
		N	551
		Std. Deviation	18.593
	Total	Mean	18.11
		N	897
		Std. Dev	17

<sup>1</sup>Women; <sup>2</sup>Men; <sup>3</sup>Standard Deviation

## STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Page 1- Lines 1-2 Page 2 line 39
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Page 2-3, lines 39-62
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 4-5, lines 84-114
Objectives	3	State specific objectives, including any prespecified hypotheses	Page 5-6, lines 108-114
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	Page 5-6, lines 118-128, lines 133-139
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 5-6, lines 118-128, lines 133-139, lines 145-161
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	Page 5-6, Lines 133-139
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Page 6-7 Lines 284-289, Lines 295-375
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Page 6-7 Lines 284-289, Lines 295-375
Bias	9	Describe any efforts to address potential sources of bias	Page 6, Lines 285-289, 373, 375
Study size	10	Explain how the study size was arrived at	Page 6 lines 283-286



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Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Page 7-8, Lines 378-401
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Page 7-8, Lines 378-401
		(b) Describe any methods used to examine subgroups and interactions	Page 7-8, Lines 378-401
		(c) Explain how missing data were addressed	N/A
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed	N/A
		<i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed	
(e) Describe any sensitivity analyses			

Continued on next page

<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Page 8 Lines 404-409
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	Figure 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Page 8 Lines 404-415
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	Pages 8-11 Lines 419 -566
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	N/A
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	N/A
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Pages 8-11 Lines 419 -566
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	Pages 12-14, Lines 628-723
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Page 15, Lines 732-751
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Page 15, Lines 756-767
Generalisability	21	Discuss the generalisability (external validity) of the study results	Page 15, Lines 732-734
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Page 20 Lines 893-894

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

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**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

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# BMJ Open

## Gender-based salary differences in academic medicine: a retrospective review of data from six public medical centers in the western United States

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Manuscript ID	bmjopen-2021-059216.R2
Article Type:	Original research
Date Submitted by the Author:	12-Mar-2022
Complete List of Authors:	Miller, Hayley; Stanford University, Department of Obstetrics and Gynecology Seckel, Elizabeth; Stanford University, Department of Medicine White , Chrislyn; Kaiser Permanente San Leandro Medical Center, Obstetrics & Gynecology Sanchez, Diana; University of Illinois College of Medicine at Chicago Rubesova, Erika; Stanford University, Department of Radiology Mueller, Claudia; Stanford University, Department of Surgery Bianco, Katherine; Stanford University, Department of Obstetrics and Gynecology
<b>Primary Subject Heading</b>:	Medical education and training
Secondary Subject Heading:	Health policy, Health economics, Obstetrics and gynaecology, Radiology and imaging, Surgery
Keywords:	MEDICAL EDUCATION & TRAINING, HEALTH ECONOMICS, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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3 **Gender-based salary differences in academic medicine: a retrospective review of data from**  
4 **six public medical centers in the western United States**  
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10 Hayley Miller, MD<sup>a</sup>, Elizabeth Seckel, MA<sup>b</sup>, Chrislyn White, MD<sup>c</sup>, Diana Sanchez, MPH<sup>d</sup>,  
11 Erika Rubesova, MD<sup>e</sup>, Claudia Mueller, PhD, MD<sup>f\*</sup>, and Katherine Bianco, MD<sup>a\*</sup>  
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Key Words: Academic medicine, gender inequity, income gap, equity

Abstract word count: 286 words

Manuscript word count 3165 words

## Abstract

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

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

**Setting:** Faculty from six state-run, publicly-funded academic medical centers in the western US.

**Participants:** 799 faculty, 225 assistant (51% women), 200 associate (40% women), and 374 full professors (32% women) from general surgery (26% women), obstetrics and gynecology (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 programs. 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 gynecology ( $R^2 = 0.068$ ,  $F(4, 174) = 3.172$ ,  $p < 0.05$ ). Women faculty within these departments earned almost \$75,000 less than their men colleagues. The disparity in salary

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3 originates from gaps in supplemental income, as baseline compensation was not significantly  
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5 different between men and women. No significant gender difference in total compensation for  
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7 radiology was found ( $R^2 = 0.01$ ,  $F(4,266) = 0.591$ , *n.s.*). Higher h-index was associated with  
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9 higher baseline compensation across all departments as well as with supplemental income for  
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11 general surgery. Higher h-index was related to lower supplemental income for radiology and was  
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13 not related to supplemental income for obstetrics and gynecology.  
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17 **Conclusions:** Further investigations should focus on discrepancies in supplemental income,  
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19 which may preferentially benefit men.  
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### 22 23 24 **Strengths and limitations of this study**

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26 • This is a large population study assessing distribution of salary among three diverse  
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28 disciplines based on their gender distributions and distribution of the types of clinical  
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30 work.  
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34 • Linear regression models were estimated to determine the relationship between specialty,  
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36 gender, rank, h-index and salary.  
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39 • We focus on only one set of state-based academic institutions from the west coast of the  
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41 United States and so are unable to be certain whether our findings would generalize to  
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43 private practices or to those in other parts of the country.  
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46 • We examined salaries from only three departments and therefore cannot be certain that  
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48 other clinical specialties would follow similar patterns.  
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51 • As the data were obtained from websites, we were unable to delve more deeply into the  
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## Introduction

The more education a woman has, the greater the gender disparity in salary is seen.<sup>1</sup> This disparity is especially glaring for physicians and surgeons, with women earning about 74 cents for every dollar men earn.<sup>2</sup> Representation of women in medicine is increasing dramatically, however the gender salary gap remains.<sup>3-4</sup> Women faculty have been shown to have lower salaries, smaller start-up packages, and limited authorship roles.<sup>3-13</sup> Despite the Equal Pay Act of 1963, this gap continues to exist across specialties, practice settings, work hours, and other characteristics,<sup>6-10</sup> and persists even after accounting for age, experience, specialty, faculty rank, and measures of research productivity and clinical revenue.<sup>6-13</sup> Commonly cited explanations for this gender disparity in salary include differences in negotiating skills, opportunities to join networks of influence within organizations, discrimination, and implicit and explicit bias.<sup>6,7,10,14-16</sup>

There is an increasingly large body of evidence that gender not only impacts salary but also faculty rank and research productivity.<sup>6-13</sup> 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.<sup>10</sup> 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.<sup>13</sup>

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3 In order to close the salary gap in academic medicine, we must be clear where in total  
4 compensation packages this disparity originates. Previous data as it relates to non-medical  
5 occupations suggests that gender differences in salary can be attributed to the salary gaps within  
6 specific occupations, not across occupations.<sup>17</sup> As such, we chose to focus this study on  
7 academic salary at a single time point, expecting to see differences in salary based on gender,  
8 faculty rank and h-index, a metric for evaluating the cumulative impact of an author's scholarly  
9 output and performance calculated by comparing number of publications to citations.<sup>18</sup> The  
10 primary objective of our study was to identify where in total compensation the salary gap  
11 originates by evaluating differences in salary based on gender, rank and research productivity for  
12 three diverse academic medical specialties. Our areas of interest – salary, academic rank, and  
13 research productivity – are typical benchmarks for professional development.<sup>6-11,18,19</sup> We  
14 hypothesized that women would earn significantly less total compensation across all ranks, even  
15 after accounting for rank and research productivity.  
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## 35 **Methods**

### 36 **Study Design**

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38 This was a retrospective population study of total faculty compensation for assistant, associate,  
39 and full professors at six major public academic medical centers using a single time point during  
40 2016. We chose the time point of 2016 as it was the most recent year for which data was  
41 available at the time. Three diverse specialties – general surgery, obstetrics and gynecology, and  
42 radiology - were chosen, primarily because of their gender distributions and distribution of the  
43 types of clinical work.<sup>8,20-25</sup> General surgery and radiology are male-dominated specialties, while  
44 obstetrics and gynecology is a female-dominated specialty.<sup>20-25</sup> There is also a diversity of  
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3 clinical work throughout these three subspecialties with general surgery being dominated by  
4 surgical procedures, radiology not being surgical in nature, and obstetrics and gynecology with a  
5 more diverse balance of clinical work.<sup>3,8,20-26</sup> Ethics approval and consent to participate was  
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8 waived by the Institutional Review Board of the Stanford University School of Medicine.  
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### 14 **Study population**

15 Archived online faculty profiles were reviewed to collect information on gender. Trained  
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17 research staff utilized the internet archive service Wayback Machine<sup>26</sup> to collect data on gender  
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19 from 2016 online faculty profiles at each department's website. Gender was identified on faculty  
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21 profiles by identifying the pronoun included on faculty profiles. In the occasion that the pronoun  
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23 was not specifically stated, the research staff used faculty photo and name to identify gender.  
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25 Faculty from six academic institutions were included. We were able to stratify by assistant,  
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27 associate, or full professor faculty rank.  
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### 35 **Total compensation, rank and research productivity**

36 A publicly available database that contains all the compensation information for faculty and  
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38 employees at a large university system was used to look at total faculty compensation in three  
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40 different ways: Total compensation, baseline compensation, and supplemental income.<sup>27</sup> Total  
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42 compensation was defined as baseline compensation plus supplemental income. Baseline  
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44 compensation was defined as base salary minus reductions due to participation in the voluntary  
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46 Employee Reduction in Time and phased retirement programs. Supplemental income (commonly  
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48 referred to as "discretionary pay") was defined as negotiated additional salary for clinical care  
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50 and research that was funded from earned clinical revenue as well as contracts and grants. This  
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3 includes: pay for Summer Session or University Extension teaching, pay for research performed  
4 during summer months that is funded by extramural contracts and grants, performance-based  
5 incentive compensation and similar payments that recognize achievement of specific  
6 performance goals or exemplary service, pay for shift differentials (e.g., night or holiday call),  
7 payout of unused vacation leave upon separation, and lump sum payments made as part of the  
8 settlement of union bargaining agreements. Data on academic rank and specialty was collected  
9 from the same database. Elsevier's SCOPUS was used to collect data on h-index. Faculty  
10 members' h-indexes were obtained using their full name, last name and first and middle initials,  
11 and/or maiden name when appropriate. (Supplementary Table)  
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### 26 **Statistical analysis**

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28 Our data set consisted of 6 variables: (1) Department – a three-level categorical variable  
29 (surgery, obstetrics and gynecology, and radiology); (2) Rank - three-level categorical variables  
30 (assistant, associate, and full); (3) Gender; (4) h-index – a measure of publication output; (5)  
31 baseline compensation – i.e., salary; and (6) supplemental income – e.g. bonuses, income for  
32 extra work. Linear regression models were estimated to determine the relationship between these  
33 factors and salary. Compensation was selected as our primary variable and gender, academic  
34 rank, and h-index as secondary variables. Rank, gender, and h-index were treated as independent  
35 variables, whereas “baseline compensation” and “supplemental income” were treated as  
36 dependent variables. Because rank is a three-level categorical level, it was split into two dummy  
37 variables with “Full” as reference value. Three regression models were run per department: one  
38 to predict total compensation (baseline compensation plus supplemental income), one to predict  
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3 baseline compensation, and one to predict supplemental income. Data was entered into SPSS  
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5 version 20, with a *p* value of less than 0.05 considered to be significant.  
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## 10 **Patient and Public Involvement**

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12 There was no patient or public involvement.  
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## 15 **Results**

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17 988 total employees were assessed for eligibility (see **Figure 1**). 110 (11%) were excluded for  
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19 having a role other than assistant, associate, or full professor. A further 79 (8%) were excluded  
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21 because they were listed on the department website but not in the payroll database. After  
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23 exclusions, our analysis included 799 faculty members, 312 (39%) were identified as women and  
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25 487 (61%) were identified as men and distribution among ranks included 225 (28%) assistant,  
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27 200 (25%) associate, and 374 (47%) full professors (**Table 1**).  
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36 Overall, women represented 26% of general surgery faculty (n=126), 70% of obstetrics and  
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38 gynecology faculty (n=106), and 34% of radiology faculty (n=80). Among ranks, women made  
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40 up 51% of all assistant professors (n=115) and men made up 49% (n=110), women made up 40%  
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42 of associate professors (n=79) and men made up 60% (n=121), and women made up 32% of full  
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44 professors (n=118) while men made up 68% (n=256) (**Table 1**). Distribution of stratified by  
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46 gender and academic rank is presented in **Figure 2** and **Table 2**.  
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## 52 **General surgery**

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3 Distribution of salary for general surgery is presented in **Figure 3**. Within general surgery, the  
4 overall regression for total compensation was significant ( $R^2 = 0.159, F(4, 299)$   
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13 Looking specifically at the three independent variables, we found that: Gender was significantly  
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15 different with women earning lower total compensation than men ( $\beta = -84,970, p < 0.05$ ).  
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17 Rank was not significantly different for total compensation. Higher h-index was significantly  
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19 associated with higher total compensation ( $\beta = 5,023, p < 0.01$ ).  
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24 In an attempt to analyze what specifically drove the effect on total compensation, we ran separate  
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26 analyses on “baseline compensation” and “supplemental income.” In terms of baseline  
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28 compensation, the overall regression was significant ( $R^2 = 0.323, F(4, 299)$   
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For “supplemental income”, the overall regression was significant, again examining the  
combined effect of gender, rank, and h-index, was significant ( $R^2 = 0.096, F(4,299) = 7.900,$   
 $\beta = 35.737, p < 0.01$ ). 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 (  
 $\beta = 1,606, p < 0.01$ ).

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3  $p < 0.01$ ). In terms of specific variables: Gender was significantly associated with supplemental  
4 income ( $\beta = -79,467, p < 0.05$ ) with women earning significantly less of this salary component  
5 than men. There was no difference for rank on supplemental income. Higher h-index was  
6 significantly associated with supplemental income ( $\beta = 3,418, p < 0.01$ ).  
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### 14 **Obstetrics and gynecology**

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17 Distribution of salary for obstetrics and gynecology is presented in **Figure 4**. For obstetrics and  
18 gynecology, the overall regression, which included the variables of gender, rank, and h-index, for  
19 total compensation was significant ( $R^2 = 0.068, F(4, 174) = 3.172, p < 0.05$ ). Looking at each  
20 variable specifically, there was a significant difference in gender, with women earning less total  
21 compensation than men ( $\beta = -84,221, p < 0.02$ ). Rank was not found to be significantly  
22 different for total compensation for either assistant or associate professors compared to full  
23 professors. H-index was also not significantly associated with total compensation.  
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35 For baseline compensation, the overall regression of the combined effect of gender, rank, and h-  
36 index was significant ( $R^2 = 0.485, F(4, 174) = 40.986, p < 0.01$ ). For the specific variables:  
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38 There was no significant difference between women and men in baseline compensation. Rank  
39 was associated with baseline compensation, with both assistant ( $\beta = -52,696, p < 0.01$ ) and  
40 associate professors ( $\beta = -36,711, p < 0.01$ ) earning significantly less than full professors. H-  
41 index was also significant ( $\beta = 1,314, p < 0.01$ ), with higher h-index linked to higher baseline  
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3 For supplemental income, the overall regression of the combined effect of gender, rank, and h-  
4 index was not significant ( $R^2 = 0.037$ ,  $F(4, 174) = 1.666$ , *n.s.*). However, when we looked at  
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6 the three variables specifically within the regression, there was a significant difference in gender,  
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8 with women earning less supplemental income than men ( $\beta = -74,168$ ,  $p < 0.05$ ). There were  
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10 no significant differences in supplemental income for the variables of rank or h-index.  
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## 16 17 **Radiology**

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19 Distribution of salary for radiology is presented in **Figure 5**. Within radiology, the overall  
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21 regression, which again examined the combined effect of gender, rank, and h-index for total  
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23 compensation was not significant ( $R^2 = 0.01$ ,  $F(4,266) = 0.591$ , *n.s.*). Furthermore, none of the  
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25 individual variables of gender, rank, or h-index showed any significant association with total  
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27 compensation.  
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33 In terms of baseline compensation, the overall regression, which again included the combined  
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35 effect of gender, rank, and h-index, was significant ( $R^2 = 0.395$ ,  $F(4,265) = 43.293$ ,  $p < 0.01$   
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37 ). For the specific variables: Gender was not significantly associated with baseline compensation  
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39 as men and women earned similar base compensation. Significant differences in baseline  
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41 compensation by rank were identified with assistant professors ( $\beta = -52,145$ ,  $p < 0.01$ ) and  
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43 associate professors ( $\beta = -43,848$ ,  $p < 0.01$ ) earning significantly lower baseline compensation  
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45 than full professors. Higher h-index was also significantly associated with higher baseline  
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47 compensation ( $\beta = 979$ ,  $p < 0.01$ ).  
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3 For supplemental income, the overall regression of the combined effect of gender, rank, and h-  
4 index was significant ( $R^2 = 0.064$ ,  $F(4, 266) = 4.567$ ,  $p < 0.01$ ). In terms of the specific  
5 variables, there was no significant association between gender and supplemental income. Rank  
6 also not associated with supplemental income. H-index was significantly associated with  
7 supplemental income ( $\beta = -947$ ,  $p < 0.05$ ). Higher h-index linked to lower supplemental  
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## 19 Discussion

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22 Our results show that while there are significant differences in total compensation for women  
23 faculty in general surgery and obstetrics and gynecology, it is not baseline compensation that  
24 accounts for the salary gap between women and men. Instead, other components of salary,  
25 classified in our data as supplemental income, appear to contribute to acknowledged differences  
26 in salary between women and men faculty members within our target institutions. In our review  
27 of publicly available salary data,<sup>26,27</sup> women faculty within the departments of general surgery  
28 and obstetrics and gynecology earned almost \$75,000 less than their men colleagues. This  
29 supplemental income is described as coming from additional clinical responsibilities such as call  
30 income as well as support for administrative work or leadership positions and was not  
31 consistently linked to academic productivity, as defined by h-index, across specialties in our  
32 study.<sup>27</sup> These findings echo the work of the economist Claudia Goldin who has described the  
33 gender salary gap in a variety of professions as being related not to differences in baseline  
34 compensation but rather to differences related to flexibility or amount of work that is taken on by  
35 women versus men.<sup>27,28</sup>  
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3 Previous studies offer many theories to explain the gender gap, including women are less likely  
4 to be asked to serve as leaders, experience effective mentoring, receive equitable allocation of  
5 research funding, and seek additional call hours or clinical work in favor of different household  
6 and childrearing obligations.<sup>3,29-35</sup> Women faculty who work flexible hours may be less likely  
7 than men to receive leadership positions that result in bonus salary.<sup>29</sup> In fact, faculty who need a  
8 more flexible work schedule remain as junior faculty and receive less support.<sup>30</sup> These  
9 circumstances help to explain our findings the lower “additional” or supplemental income for  
10 women faculty within the two specialties. One solution is to alter promotion policies to better  
11 support the diversity of needs.<sup>30</sup> Additional solutions can be found in the NIH’s Gender  
12 Inequality Task Force Report.<sup>31</sup>

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28 Interestingly, the gender gap for supplemental income in our study was true within obstetrics and  
29 gynecology, despite the fact that women comprise a majority of faculty members within this  
30 specialty. Furthermore, no gender gap was identified for the department of radiology, despite its  
31 male predominance. This finding suggests that the gender distribution of the department alone  
32 does not necessarily guide salary discrepancies between women and men faculty members.  
33 Instead, it seems that other factors, such as the nature of the clinical work itself, may contribute  
34 to the gender salary gap.<sup>31</sup> It has been acknowledged in previous studies that surgical  
35 subspecialties are highly technical and predominantly occupied by men, and often times men are  
36 among the highest paid with roles as researchers, opposed to women within these specialties  
37 occupying lower status communal roles as educators.<sup>34</sup> For instance, no gender differences were  
38 noted for any portion of salary within the radiology departments that we examined in this study.  
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54 Radiology clinical work differs from that of other specialties in that it is predominantly shift-

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3 based and less procedural than general surgery and obstetrics and gynecology. Radiology may  
4 thereby offer fewer opportunities for gender-based increases to supplemental income that might  
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6 be earned through additional clinical work.  
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12 Our findings also validate previous studies finding striking gender inequities in the higher  
13 academic ranks.<sup>13</sup> Common explanations for these gender differences include the gender-based  
14 hiring disparities of previous generations, lack of transparency of salary, promotion, mentoring  
15 and female role-models, and time away for childbearing and family obligations.<sup>14,15,29,30,33</sup> There  
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17 is also recent evidence that women physicians might start their career with lower salary  
18 expectations than men, which could become a self-fulfilling prophecy for later salary.<sup>30,34</sup>  
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20 Furthermore, there is some indication that women prioritize salary less than men do and are  
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22 judged more harshly for initiating negotiations.<sup>6,14,15,30</sup>  
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33 In summary, gender disparities have been well documented in academic medicine, and our study  
34 offers a unique perspective of the different components that make up the academic medicine  
35 physician salary. Previous studies have offered suggestions to improve this disparity, which will  
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37 be important for closing this supplemental income gap. Suggestions include transparency of  
38 starting salaries to young professionals, initiating negotiation training to improve starting salary  
39 packages, mentorship in career advancement for women junior faculty, investigation of research  
40 grant award processes, and further adoption of programs to address disparities in grant award  
41 processes.<sup>31</sup> Implementation of a university-wide objective compensation planned implemented  
42 by the Association of American Medical Colleges regional median salary (AAMC-WRMS) was  
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44 associated with reduced gender-based differences in salary among surgery faculty within the  
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3 institution and a statistically significant increase in salary among female faculty. Objective  
4 compensation plans may mitigate gender-based implicit bias in salary negotiations and  
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6 promotions.<sup>35</sup>  
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## 10 11 12 **Limitations**

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14 Our study has several limitations. First, we focus on only one set of state-based academic  
15 institutions from the west coast of the United States and so are unable to be certain whether our  
16 findings would generalize to private practices or to those in other parts of the country.  
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18 Furthermore, we examined salaries from only three departments and therefore cannot be certain  
19 that other clinical specialties would follow similar patterns. However, the departments were  
20 chosen to accurately reflect a set of departments with a diverse set of gender distribution and  
21 clinical work. Finally, since our data was obtained from websites only, we are unable to delve  
22 more deeply into the components of supplemental income salary beyond the general description  
23 that is offered publicly. For instance, we cannot determine how much is related to compensation  
24 for clinical or administrative work versus research funding. We are also not certain what types of  
25 research funding are included in this supplemental income and whether certain grants (eg,  
26 external) might be differently influenced by factors such as competitiveness of topic or number  
27 of proposals submitted. We are therefore not able to completely explain what aspect of  
28 compensation supplemental incomes represents or why it is not related to academic productivity  
29 in the same way across the three departments. Another limitation is that the 2016 data may not  
30 reflect more contemporary remuneration, however, based on salary disparity trends, we do not  
31 anticipate the salary gap narrowing since the study period. Additionally, during the study period,  
32 gender pronouns were included in most faculty profiles, however, pronouns were not available  
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3 on a limited number of faculty profiles. For faculty who did not include gender pronouns, we  
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5 were limited to faculty name and profile photo and a trained research staff member selected the  
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7 assumed gender. Additionally, we did not have granular data to distinguish non-binary and  
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9 gender expansive people. We recognize that diversity and equity is of utmost importance in all  
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11 underrepresented populations. Further research is warranted on the impact of other variables  
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13 such as race, ethnicity, and LGBTQ+ people.  
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## 19 **Conclusion**

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22 In sum, our study observed the trends of salary within three clinical specialties at state-run,  
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24 publicly-funded academic institutions. For this sample, gender differences were most notable in  
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26 the fields of general surgery and obstetrics and gynecology. We suggest that further  
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28 investigations should focus less on gender inequities of base salary, which may not be relevant to  
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30 clinical faculty in academic settings as they are institutionally set to be independent of gender,  
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32 and more on discrepancies in discretionary or supplemental income, which may preferentially  
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34 benefit men. With closer analysis, we might be able to achieve a better understanding of whether  
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36 women are not receiving their full earning potential or, as has been suggested in the economic  
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38 literature,<sup>28,36</sup> whether they are instead prioritizing flexibility in work hours over compensation.  
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41 Finally, with our observation that the gender salary gap might not be as prominent within the  
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43 field of radiology, additional studies of this specialty could identify ways in which it could serve  
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45 as a model for gender-based salary structures for clinicians.  
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**Table 1.** Demographic data for women and men faculty by institution and department at six academic institutions in 2016.

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

<sup>1</sup>Women; <sup>2</sup>Men

<sup>3</sup>Institution 4 did not have a surgery or radiology department.

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

<i>Department</i>	<i>Rank</i>	<i>Gender</i>	<i>Total</i>	<i>Total Compensation (Mean ± SD)*</i>	<i>Baseline Compensation (Mean ± SD)*</i>	<i>Supplemental Income (Mean ± SD)*</i>
<i>General Surgery</i>	Assistant	W <sup>1</sup>	58	325± 167	100±21	225 ±165
		M <sup>2</sup>	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
<i>Ob/Gyn</i>	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
<i>Radiology</i>	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

<sup>1</sup>Women; <sup>2</sup>Men

\*Compensation data presented as thousands

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5 **Contributors:** Hayley Miller was a major contributor in the writing of the manuscript. Elizabeth  
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7  
8 Seckel analyzed and interpreted the data and contributed to manuscript preparation. Chrislyn  
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10  
11 White performed data abstraction and collection. Diana Sanchez performed data abstraction and  
12  
13 collection. Erika Rubesova edited the manuscript. Claudia Mueller designed the study, analyzed  
14  
15 and interpreted the data and was a major contributor in writing of the manuscript. Katherine  
16  
17 Bianco designed the study, analyzed and interpreted the data and was a major contributor in  
18  
19 writing of the manuscript. All authors read and approved the final manuscript.  
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25  
26 public information.  
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33 interests.  
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45 **Data availability statement:** All data used are publicly available.  
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50 **Ethics approval:** Ethics approval for this study was waived by the Institutional Review Board of  
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52 the Stanford University School of Medicine. IRB-40645.  
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### Figure 1. Participant exclusions

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2  
3 Participants included 799 faculty members. 988 institution employees were assessed for  
4 eligibility. 189 were excluded for having a non-professorial, full-time role. A further 79 were  
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6 excluded for only being listed on the department website, not being on 2016 payroll.  
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### 11 12 **Figure 2. Overall salary**

13  
14 Distribution of total compensation (A), baseline compensation (B) and supplemental income (C)  
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16 of women and men in general surgery, obstetrics and gynecology, and radiology departments  
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18 stratified by academic rank.  
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### 24 **Figure 3. General surgery salary**

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26 Distribution of total compensation (A), baseline compensation (B) and supplemental income (C)  
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28 of women and men in general surgery stratified by academic rank.  
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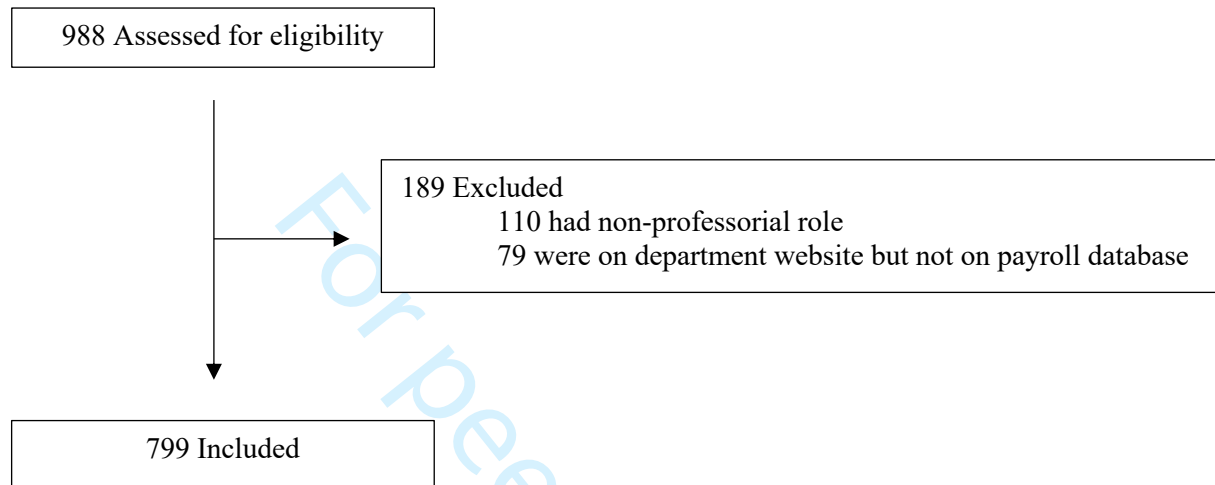
### 33 **Figure 4. Obstetrics and gynecology salary**

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35 Distribution of total compensation (A), baseline compensation (B) and supplemental income (C)  
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37 of women and men in obstetrics and gynecology stratified by academic rank.  
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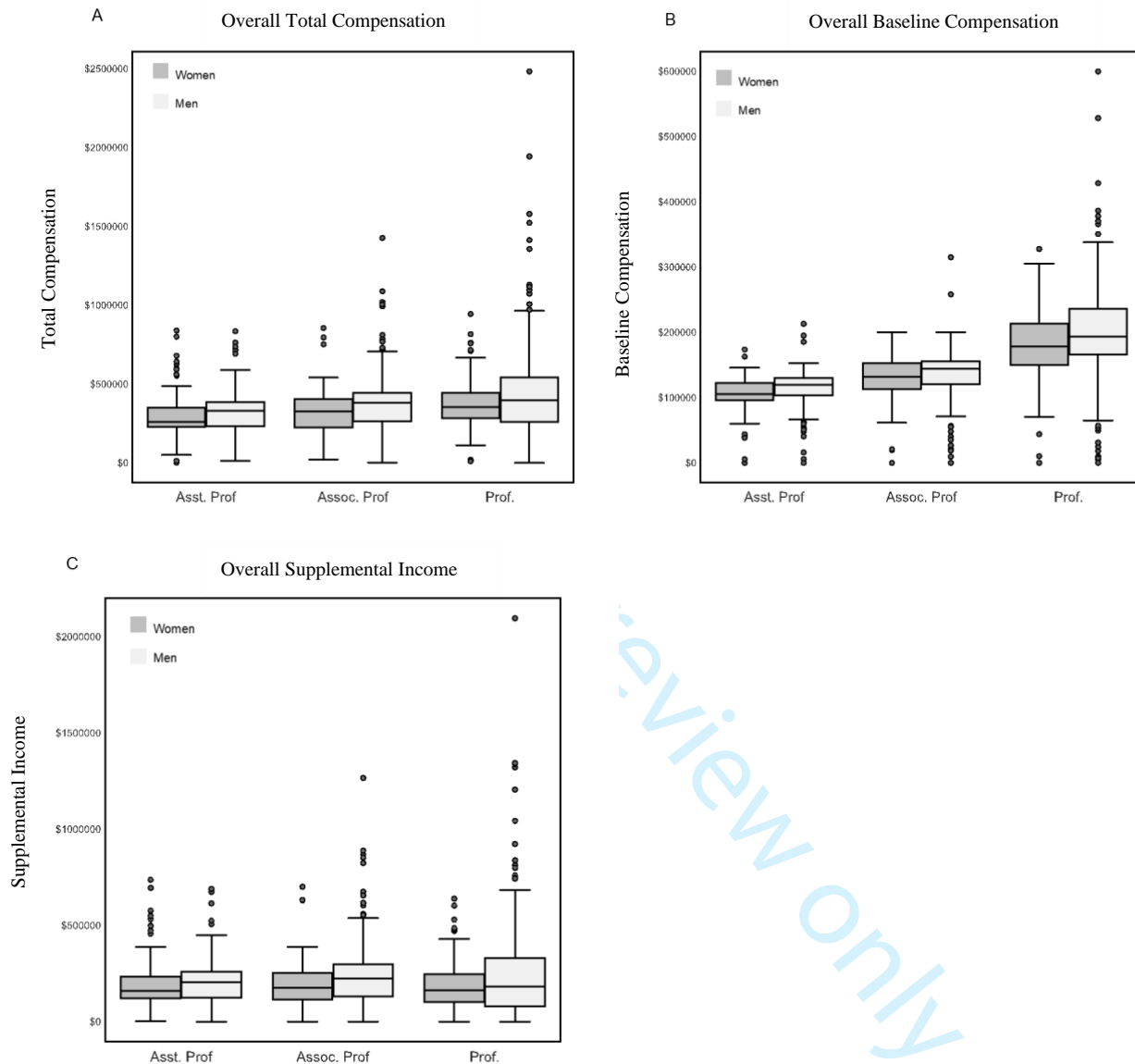
### 42 **Figure 5. Radiology salary**

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44 Distribution of total compensation (A), baseline compensation (B) and supplemental income (C)  
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46 of women and men in radiology stratified by academic rank.  
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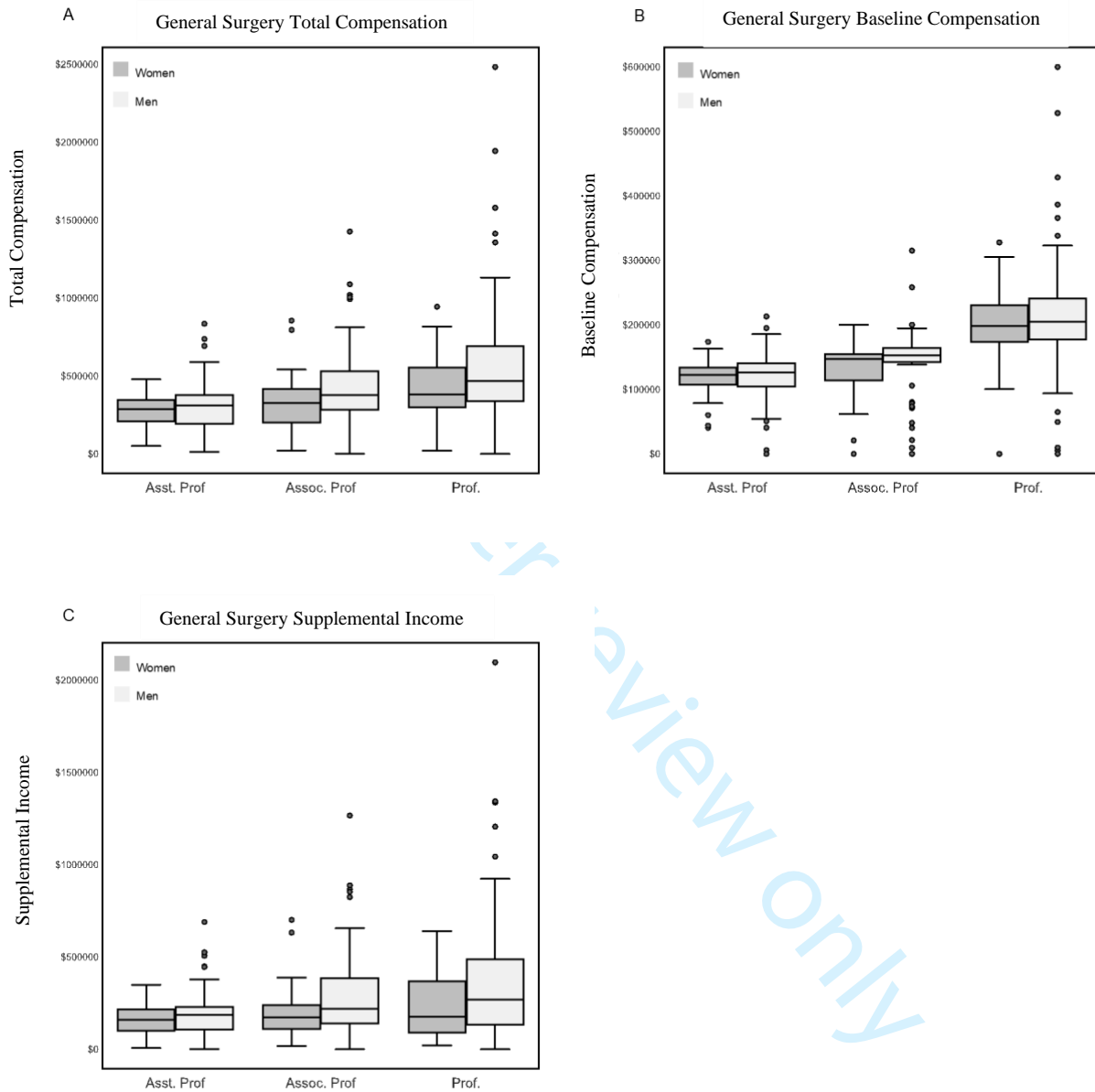
**Figure 1. Participant Exclusions.** Participants included 799 faculty members. 988 institution employees were assessed for eligibility. 189 were excluded for having a non-professorial, full-time role. A further 79 were excluded for only being listed on the department website, not being on 2016 payroll.



**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 gynecology, and radiology departments stratified by academic rank in 2016.



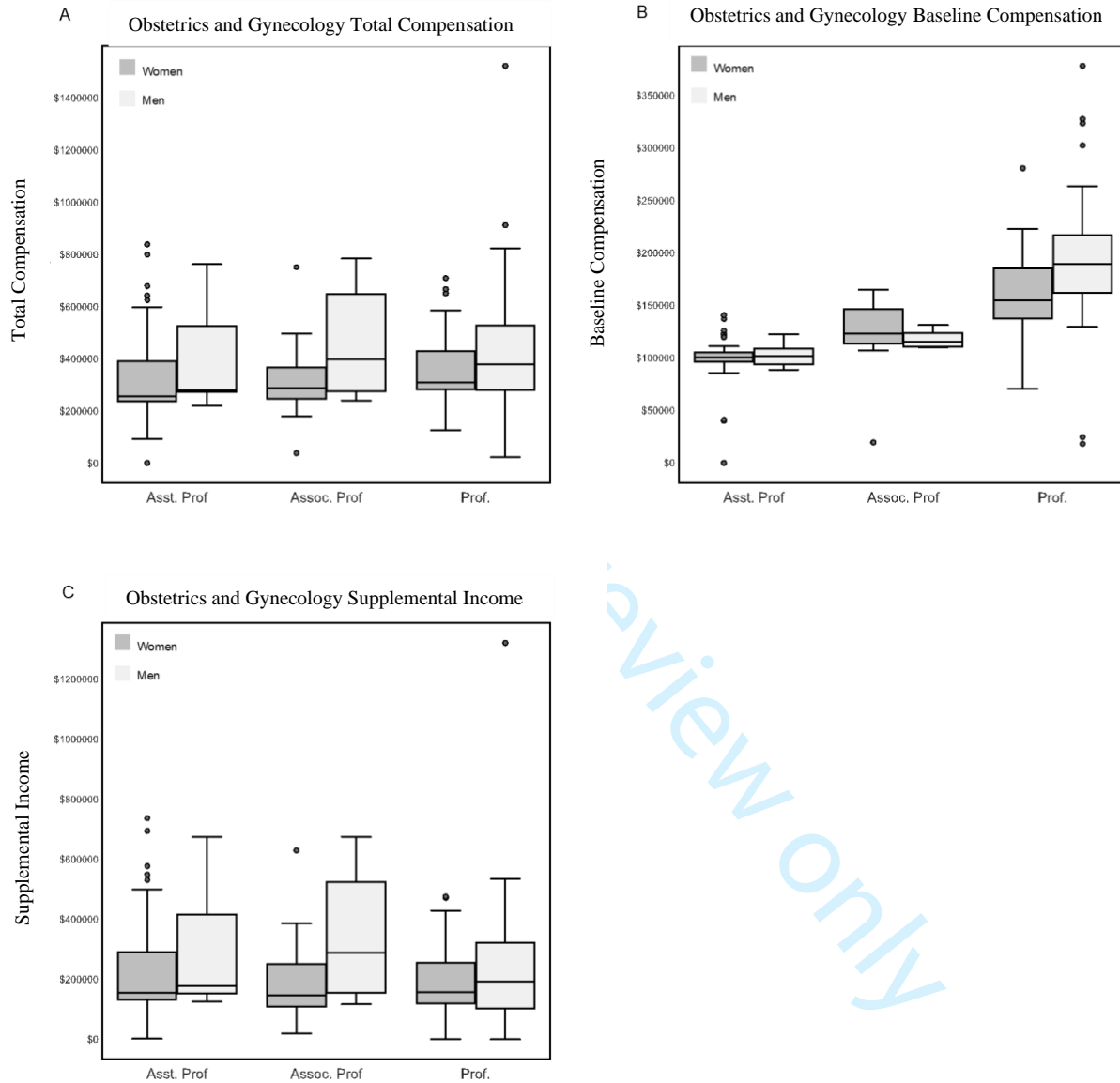
**Figure 3. General Surgery Salary.** Distribution of total compensation (A), baseline compensation (B), and supplemental income (C) of women and men in general surgery stratified by academic rank in 2016.



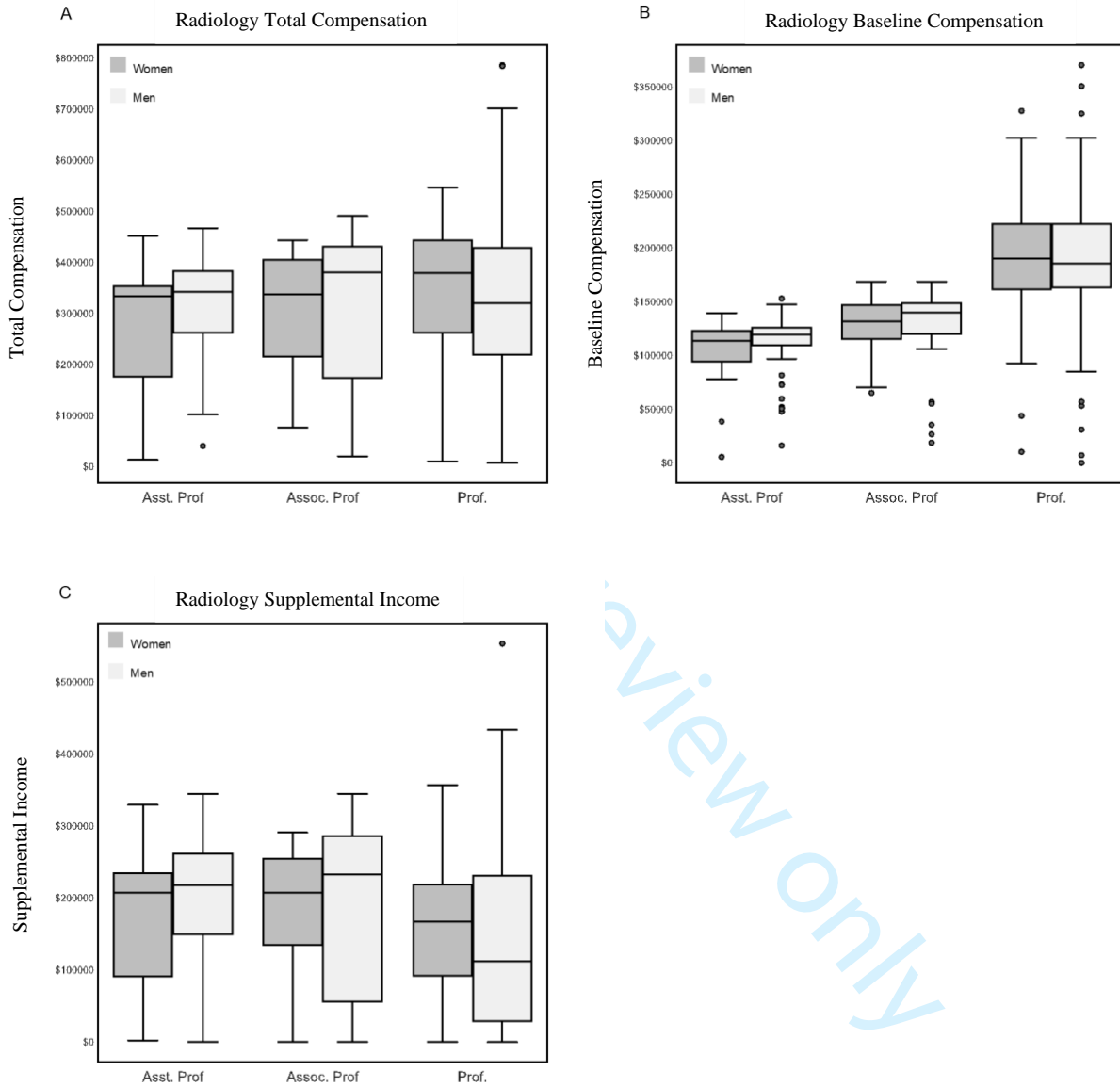
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**Figure 4. Obstetrics and Gynecology Salary.** Distribution of total compensation (A), baseline compensation (B) and supplemental income, (C) of women and men in obstetrics and gynecology stratified by academic rank in 2016.



**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 2016.



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## Supplementary Table

Department	Gender (W <sup>1</sup> , M <sup>2</sup> )		h-index
Ob/Gyn	W	Mean	7.67
		N	152
		Stand. Dev <sup>3</sup>	10.131
	M	Mean	17.32
		N	65
		Std. Dev	14.784
	Total	Mean	10.56
		N	217
		Std. Dev	12.496
Surgery	W	Mean	15.36
		N	94
		Std. Dev	14.366
	M	Mean	21.68
		N	269
		Std. Dev	17.358
	Total	Mean	20.04
		N	363
		Std. Dev	16.845
Radiology	W	Mean	17.86
		N	100
		Std. Dev	16.341
	M	Mean	22.55
		N	217
		Std. Dev	20.864
	Total	Mean	21.07
		N	317
		Std. Deviation	19.646
Total	W	Mean	12.71
		N	346
		Std. Deviation	14.070
	M	Mean	21.51
		N	551
		Std. Deviation	18.593
	Total	Mean	18.11
		N	897
		Std. Dev	17

<sup>1</sup>Women; <sup>2</sup>Men; <sup>3</sup>Standard Deviation

## STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Page 1- Lines 1-2 Page 2 line 39
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Page 2-3, lines 39-62
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 4-5, lines 84-114
Objectives	3	State specific objectives, including any prespecified hypotheses	Page 5-6, lines 108-114
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	Page 5-6, lines 118-128, lines 133-139
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 5-6, lines 118-128, lines 133-139, lines 145-161
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	Page 5-6, Lines 133-139
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Page 6-7 Lines 284-289, Lines 295-375
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Page 6-7 Lines 284-289, Lines 295-375
Bias	9	Describe any efforts to address potential sources of bias	Page 6, Lines 285-289, 373, 375
Study size	10	Explain how the study size was arrived at	Page 6 lines 283-286

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Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Page 7-8, Lines 378-401
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Page 7-8, Lines 378-401
		(b) Describe any methods used to examine subgroups and interactions	Page 7-8, Lines 378-401
		(c) Explain how missing data were addressed	N/A
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed	N/A
		<i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed	
		<i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	
		(e) Describe any sensitivity analyses	

Continued on next page

<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Page 8 Lines 404-409
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	Figure 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Page 8 Lines 404-415
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	Pages 8-11 Lines 419 -566
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	N/A
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	N/A
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Pages 8-11 Lines 419 -566
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	Pages 12-14, Lines 628-723
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Page 15, Lines 732-751
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Page 15, Lines 756-767
Generalisability	21	Discuss the generalisability (external validity) of the study results	Page 15, Lines 732-734
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Page 20 Lines 893-894

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

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**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

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