

# The physician gender pay gap in Maryland: current state and future directions

Ashley Zhou<sup>a\*</sup> , Carlued Leon<sup>b</sup>, Carolyn O'Connor<sup>c</sup>, Catherine Johannesen<sup>d</sup> and Padmini Ranasinghe<sup>a</sup>

<sup>a</sup>The Johns Hopkins University School of Medicine, Baltimore, MD, USA; <sup>b</sup>The Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA; <sup>c</sup>Georgetown University School of Medicine, Washington, DC, USA; <sup>d</sup>Maryland Medical Society (MedChi), Baltimore, MD, USA

## ABSTRACT

**Background:** Over the last few decades, more attention has been paid to the physician gender pay gap and more interventions have been attempted. This paper discusses the physician gender pay gap between 2017 and 2021 in Maryland.

**Methods:** An online cross-sectional survey was distributed to over 10,000 physicians in the Maryland Medical Society, featuring questions regarding employment characteristics, compensation, impact of the COVID-19 pandemic, and educational debt. Using descriptive and regression analyses, we explored cross-sectional associations between gender and employment characteristics.

**Results:** Male physicians reported a significantly higher average 2020 pre-tax income (\$333,732 per year) than female physicians (\$225,473 per year,  $p < 0.001$ ), amounting to a nearly 50% difference in raw income, consistent with a previously reported pay gap in 2016. Women physicians earned 31.5% less than their male colleagues in 2020 and were projected to earn 28.7% less in 2021. Female physicians were also more likely to have educational debt (33.6% vs. 12.9%,  $p < 0.001$ ) and also more likely to have a high burden of debt, with 36% owing over \$200,000 in education loans, compared to 14.7% of men ( $p < 0.01$ ).

**Conclusion:** The physician gender pay gap in Maryland has remained relatively stable over four years, including the period of the COVID-19 pandemic.

## KEY MESSAGES

- The physician gender pay gap in Maryland has remained stable over four years, including the period of the COVID-19 pandemic.
- Female physicians earned over 30% less than male physicians in Maryland in 2020.
- Female physicians are more likely to have educational debt, and when they do, they have a greater magnitude of debt.

## ARTICLE HISTORY

Received 27 June 2023

Revised 4 September 2023

Accepted 10 September 2023

## KEYWORDS

Gender pay gap; Maryland; gender equity; interventions

## Introduction

There is much to do to achieve gender equity—in the broader world, as well as in the world of medicine. The physician gender pay gap begins at the very beginning of a career with the starting salary [1–3] and compounds over the course of the career, with effects lasting even after the end of the career by significantly decreasing available retirement income. Even after specialty, provider, and practice characteristics have been adjusted for, the pay gap remains steadfast [2,4–11].

The physician gender pay gap has been well documented in different countries (the United States, Canada, Japan, the United Kingdom) [1,5,12–18], different states, [19] and different contexts (among Medicare-participating physicians, academic physicians) [2,6,9,20–22] over the years, yet it is clear that it remains persistent. The reasons for its stubborn endurance are multifactorial, as are the reasons for the gender pay gap itself [11]. Accordingly, any attempt at addressing the problem must be multifactorial as well, operating at different levels to prevent potential inequity at each step. Some solutions are

**CONTACT** Padmini Ranasinghe  [pranasi1@jhmi.edu](mailto:pranasi1@jhmi.edu)  Division of Hospital Medicine, Johns Hopkins Hospital, 600 N. Wolfe Street, Mayer 8-134, Baltimore, MD 21287, USA

\*Present address: The Mayo Clinic, Rochester, MN, USA.

© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

more straightforward to implement than others, with a body of evidence to support their efficacy in narrowing the gap; others require time, patience and persistence.

Therefore, it is critical to have transparent data reporting on the current state of the physician gender pay gap as well as any progress towards ameliorating it. While more attention has been paid to the gender pay gap in recent years, resulting in various interventions, the COVID-19 pandemic has greatly impacted physician income and burnout [23], with disproportionate effects on female physicians. The goal of this paper is to provide a clearer picture of the post-pandemic physician gender pay gap in Maryland.

## Methods

### Study population

The Maryland Medical Society (MedChi) contracted with Merritt Hawkins LLC to administer a compensation and work satisfaction survey that was developed with input from physician members on the MedChi Board. This online cross-sectional survey was sent to physicians in Maryland within the Maryland Medical Society between August and October 2021. Links to the survey were distributed through email to over 10,000 physician members within the MedChi database. Because this survey was administered through MedChi and Merritt Hawkins, formal Institutional Review Board approval was not obtained for this study, particularly as the project was intended for quality improvement and baseline assessment. The project did not involve experimentation with human subjects and all data was de-identified prior to our analysis. There was no formal informed consent process as the link was included in MedChi newsletters and members could decide themselves if they wanted to participate or not participate and no compensation was provided for participation.

### Survey design

The survey included questions on demographics (gender, age and race/ethnicity), employment characteristics (specialty, practice status, weekly work hours, number of work days, number of work weekends, non-clinical work hours), compensation (2020 pre-tax income, projected pre-tax income for 2021, type of compensation, type of production bonus and employment benefits), impact of the COVID-19 pandemic (professional impact, income impact) and current levels of educational debt.

## Statistical analysis

We conducted descriptive analyses to summarize the demographic and employment characteristics of physicians participating in the study. We used Chi-square tests to assess cross-sectional differences between female and male physicians.

Using logistic regression analysis, we explored cross-sectional associations between gender and employment characteristics, including practice status, work hours, income and the perceived professional impact of the COVID-19 pandemic. To analyze pay differences, we conducted ordinary least square (OLS) linear regression analysis using the natural log of pre-tax income. The coefficients of the linear regression were exponentiated to determine the percentage gap in pay between female and male physicians. The regression analyses generally controlled for race, age, work hours, practice status (i.e. independent practice versus otherwise) and physician specialty.

## Results

### Participant and employment characteristics

A total of 340 physicians completed the survey (Table 1). Of these, most were male physicians (57.4%) aged 55–73 years (48.5%). Male physicians were generally older (59.8% were aged 55–73) than female physicians (47.2% were aged 39–54,  $p < 0.001$ ). Most participants self-identified as White (65.3%) and practiced independently (37.4%). Of those employed at an organization, most worked at a physician-owned medical group (16.9%), an academic facility (12.2%), or a hospital-owned medical group (11.9%).

Most physicians worked over 40 hours per week (65.6%). On average, participants reported doing 11.9 hours of non-clinical work a week (standard deviation (SD) = 12.3) and working 4.8 days per week (SD = 1.1). Most physicians (69.2%) worked at least one weekend a year.

Participants reported an average 2020 pre-tax income of \$287,616 a year and projected an average pre-tax income of \$298,854 for 2021. About half of physicians believed their current income was reasonable (50.6%). When asked how COVID-19 affected their income compared to the previous year, nearly half (46.2%) said their income was lower.

The most common form of compensation was salary with a production bonus (32.5%), followed by salary only (29.9%), and compensation on a pure production basis (20.7%). The most common types of production bonus were relative value units (RVUs)

**Table 1.** Participant and employment characteristics, total and by gender.

Variable	Total (N=340)		Females (N=144)		Males (N=194)		p-Value*
	n	%	n	%	n	%	
<i>Gender</i>	338	100.00	–	–	–	–	
Female	144	42.60	–	–	–	–	
Male	194	57.40	–	–	–	–	
<i>Age</i>	338	100.00	144	100.00	194	100.00	0.000
Less than 23 years old	0.00	0.00	0.00	0.00	0.00	0.00	
23–38 years old	50.00	14.79	27.00	18.75	23.00	11.86	
39–54 years old	111.00	32.84	68.00	47.22	43.00	22.16	
55–73 years old	164.00	48.52	48.00	33.33	116.00	59.79	
74 years or older	13.00	3.85	1.00	0.69	12.00	6.19	
<i>Race/ethnicity</i>	337	100.00	144	100.00	193	100.00	0.008
Asian or Asian American	54.00	16.02	16.00	11.11	38.00	19.69	
Black or African American	24.00	7.12	18.00	12.50	6.00	3.11	
Hispanic, Latino, Latina or Latinx	8.00	2.37	2.00	1.39	6.00	3.11	
Middle Eastern or Northern African	10.00	2.97	3.00	2.08	7.00	3.63	
White	220.00	65.28	96.00	66.67	124.00	64.25	
Prefer not to disclose/Other	21.00	6.23	9.00	6.25	12.00	6.22	
<i>Practice status</i>	337	100.00	144	100.00	193	100.00	0.096
Employed by a community health centre	14	4.15	9	6.25	5	2.59	
Employed by a hospital	18	5.34	10	6.94	8	4.15	
Employed by a hospital-owned medical group	40	11.87	14	9.72	26	13.47	
Employed by a physician-owned medical group	57	16.91	22	15.28	35	18.13	
Employed by an academic facility	41	12.17	25	17.36	16	8.29	
Employed by an urgent care centre	2	0.59	1	0.69	1	0.52	
Employed by the government/VA	7	2.08	4	2.78	3	1.55	
Independent	126	37.39	48	33.33	78	40.41	
Other	32	9.50	11	7.64	21	10.88	
<i>Hours worked per week</i>	337	100.00	144	100.00	193	100.00	0.015
0–10 h	9	2.67	1	0.69	8	4.15	
11–20 h	8	2.37	2	1.39	6	3.11	
21–30 h	23	6.82	17	11.81	6	3.11	
31–40 h	76	22.55	32	22.22	44	22.80	
41–50 h	99	29.38	43	29.86	56	29.02	
51–60 h	81	24.04	31	21.53	50	25.91	
61–70 h	27	8.01	9	6.25	18	9.33	
71–80 h	8	2.37	6	4.17	2	1.04	
81 h or more	6	1.78	3	2.08	3	1.55	
<i>Non-clinical hours worked per week</i>	337		144		193		0.203
Mean	11.96		12.94		11.22		
SD	12.25		13.56		11.17		
<i>Days worked per week</i>	337		144		193		0.345
Mean	4.81		4.75		4.86		
SD	1.08		1.09		1.07		
<i>Weekends worked per year</i>	338	100.00	144	100.00	194	100.00	0.300
None	104	30.77	40	27.78	64	32.99	
1–5	54	15.98	28	19.44	26	13.40	
6–10	45	13.31	17	11.81	28	14.43	
11–15	43	12.72	21	14.58	22	11.34	
16–20	24	7.10	9	6.25	15	7.73	
21–25	29	8.58	16	11.11	13	6.70	
26 or more	39	11.54	13	9.03	26	13.40	
<i>Current pre-tax income (FY 2020; in thousands)</i>	331		141		190		0.000
Mean	288		225		334		
SD	192		145		209		
<i>Projected pre-tax income for 2021 (in thousands)</i>	328		139		189		0.000
Mean	299		235		346		
SD	233		163		264		
<i>Compensation type</i>	338	100.00	144	100.00	194	100.00	0.529
Salary only	101	29.88	45	31.25	56	28.87	
Salary with production bonus	110	32.54	49	34.03	61	31.44	
Pure production bonus	70	20.71	24	16.67	46	23.71	
Income guarantee	9	2.66	3	2.08	6	3.09	
Other	48	14.20	23	15.97	25	12.89	
<i>Type of production bonus<sup>a</sup></i>	227	–	85	–	142	–	
Net collections (yes)	73	32.16	26	30.59	47	33.10	0.695
Quality/value metrics (yes)	69	30.40	30	35.29	39	27.46	0.215
Gross billings (yes)	13	5.73	6	7.06	7	4.93	0.504
RVUs (yes)	76	33.48	35	41.18	41	28.87	0.057
Employer provides benefits	338	100.00	144	100.00	194	100.00	0.542

(Continued)

Table 1. Continued.

Variable	Total (N=340)		Females (N=144)		Males (N=194)		p-Value*
	n	%	n	%	n	%	
Yes	311	92.01	134	93.06	177	91.24	
<i>Type of benefits<sup>a</sup></i>	311	–	134	–	177	–	
Health insurance	249	80.06	107	79.85	142	80.23	0.935
Malpractice insurance	272	87.46	119	88.81	153	86.44	0.533
Retirement (401k, pension, etc.)	263	84.57	118	88.06	145	81.92	0.138
Disability insurance	177	56.91	84	62.69	93	52.54	0.074
Dental insurance	205	65.92	93	69.40	112	63.28	0.259
Life insurance	171	54.98	78	58.21	93	52.54	0.320
Education loan forgiveness	14	4.50	7	5.22	7	3.95	0.593
<i>Current income is reasonable</i>	338	100.00	144	100.00	194	100.00	0.013
Extremely unreasonable	33	9.76	17	11.81	16	8.25	
Somewhat unreasonable	88	26.04	49	34.03	39	20.10	
Neither reasonable nor unreasonable	46	13.61	20	13.89	26	13.40	
Somewhat reasonable	115	34.02	38	26.39	77	39.69	
Extremely reasonable	56	16.57	20	13.89	36	18.56	
<i>How COVID-19 affected participant's 2020 income compared to previous year</i>	338	100.00	144	100.00	194	100.00	0.097
Much lower	61	18.05	27	18.75	34	17.53	
Slightly lower	95	28.11	35	24.31	60	30.93	
About the same	154	45.56	72	50.00	82	42.27	
Slightly higher	21	6.21	10	6.94	11	5.67	
Much higher	7	2.07	0	0.00	7	3.61	
<i>Ways in which COVID-19 affected participants professionally<sup>a</sup></i>	322	–	140	–	182	–	
I was not affected professionally by COVID-19	164	50.93	67	47.86	97	53.30	0.333
I joined another practice	14	4.35	3	2.14	11	6.04	0.089
I was furloughed	10	3.11	4	2.86	6	3.30	0.822
I found work in another field	8	2.48	2	1.43	6	3.30	0.286
My practice closed	15	4.66	4	2.86	11	6.04	0.179
I retired	2	0.62	1	0.71	1	0.55	0.852
Other	123	38.20	59	42.14	64	35.16	0.201
<i>Current level of educational debt</i>	337	100.00	143	100.00	194	100.00	<0.001
None	264	78.34	95	66.43	169	87.11	
\$1–50,000	21	6.23	9	6.29	12	6.19	
\$50,001–100,000	10	2.97	8	5.59	2	1.03	
\$100,001–150,000	9	2.67	5	3.50	4	2.06	
\$150,001–200,000	7	2.08	5	3.50	2	1.03	
More than \$200,000	26	7.72	21	14.69	5	2.58	

FY: fiscal year.

<sup>a</sup>Respondents could select more than one answer.

\*Chi-square test for differences between men and women.

(33.5%), net collections (32.2%), and quality metrics (30.4%). The most common employment benefits were malpractice insurance (87.5%), retirement benefits (84.6%), and health insurance (80.1%).

### Gender differences across employment characteristics

Men were more likely to work more than 40 hours per week (66.8%) than women (63.9%,  $p=0.015$ ; Table 1). There were no statistical differences between men and women regarding the number of non-clinical work hours ( $p=0.203$ ), the number of days of work per week ( $p=0.345$ ), and number of weekends worked a year ( $p=0.300$ ).

On average, men reported a significantly higher 2020 pre-tax income (\$333,732 per year) than women (\$225,473 per year,  $p<0.001$ ). Similarly, male physicians projected a higher average pre-tax income for

2021 (\$345,869 per year) than women (\$234,926 per year,  $p<0.001$ ). A survey conducted by MedChi in 2016 showed a similar pay gap, with male physicians reporting an average 2016 pre-tax income of \$339,876 and a projected 2017 pre-tax income of \$347,866 whereas female physicians reported an average of \$211,939 in 2017 pre-tax income ( $p<0.001$ ) and a projected 2017 pre-tax income of \$229,114 ( $p<0.001$ ) [24].

Men were also more likely to believe that their current income was reasonable (58.3%) than women (40.3%,  $p=0.013$ ). Women were more likely to have educational debt (33.6%) than men (12.9%,  $p<0.001$ ). Specifically, female physicians were more likely to owe over \$200,000 in education loans (14.7%) than men (2.6%,  $p<0.01$ ).

There were no statistical differences between men and women around form of compensation, type of production bonus, or employment benefits. Men were

as likely as women to say that the COVID-19 pandemic affected their careers or income.

### **Associations between gender and employment characteristics**

In univariate and multivariate logistic models, gender was statistically associated with whether a physician believed their income was reasonable as well as with having educational debt (Table 2). In univariate logistic regressions, female physicians were half as likely as men to think their income was reasonable (OR = 0.48; CI = 0.31–0.75;  $p=0.001$ ). In logistic models controlling for other personal and employment characteristics, women had 57% lower odds of assessing their current income as reasonable (aOR = 0.43; CI = 0.27–0.68;  $p<0.001$ ) and were over two times more likely to have school debt (aOR = 2.4; CI = 1.2–4.5;  $p=0.010$ ) than men.

In the OLS linear regression model controlling for personal and employment characteristics (Table 3), women physicians were found to earn 31.5% less income in 2020 than their male colleagues [adjusted coefficient ( $B$ ) = -0.38; CI = -0.51–0.24;  $p<0.001$ ]. Similar results were observed when using the projected 2021 pre-tax income, with female physicians expecting to earn 28.7% less income in 2021 than male physicians ( $B$  = -0.34; CI = -0.48–0.20;  $p<0.001$ ).

### **Discussion**

In 2020, female physicians in Maryland earned over 30% less than male physicians. At the time of the survey, a similar gender pay gap was projected for 2021. Looking back to 2016, a previous survey demonstrated a similar trend in the pay gap [24]. This suggests that over the period of time between 2016 and 2020, which included the brunt of the COVID-19 pandemic, little progress was made towards narrowing the physician pay gap. This pay gap was consistent across different physician subgroups, including different specialties and practice settings, and accordingly, consistent with the enormity of the pay gap, female physicians were less satisfied with their current income.

In addition to reporting lower incomes, female physicians also reported a significantly higher burden of educational debt. A greater proportion of female physicians reported having educational debt, and among the physicians with debt, more women were likely to have substantial (>\$200,000) debt. This was possibly secondary to female physicians having significantly lower incomes and/or more financial obligations,

including those related to family and domestic responsibilities, and therefore more difficulty paying off debts. Among the survey respondents, female physicians were younger on average than male physicians, consistent with the broader nationwide trend of increasing proportions of women represented in medical school and early careers [25,26]. Therefore, it is possible that women physicians tended to be earlier in their careers, when they had not yet had time to pay off their debts. Regardless of the reasons, it is clear that women physicians face more financial burden at baseline and lower earning potential. These effects will compound over the course of a career.

The explanation for the pay gap, as well as its stability over time, is likely multifactorial. Though the proportion of male physicians working more than 40 hours a week was slightly greater than that of female physicians, there were no differences in non-clinical hours worked per week, days worked per week, and weekends worked per year, making it unlikely that the gender-based income disparity is a result of male physicians working longer hours. Given the multifaceted nature of the physician gender pay gap, there are many potential opportunities for intervention at different structural levels.

On the societal level, the gender pay gap is not unique to physicians, as similar income gaps have been studied in a whole variety of professions, including among masters of business administration (MBA) graduates, lawyers, pharmacists, and nurses [27,28]. This is due, at least in part, to the gender-based distribution of household responsibilities and childrearing, leading to more unpaid labour and a greater workload borne by women. Women physicians spend 100 more minutes per day on household activities/childcare [29] and often have to defer marriage and children while training [30]. Women physicians are also more likely to work part-time, as well as consider working part-time early in their careers [31]. Among women who choose to work part-time, family is the most commonly cited factor and in turn the part-time work gender gap is particularly pronounced among physician parents [31]. Given that women are more likely to have their work schedules impacted by family and domestic responsibilities, more flexible work schedules should be available, without consequences to career opportunities or pay [3]. This means practical measures such as avoiding scheduling meetings during school pick-up/drop-off times and recruiting part-time staff for when clinician-scientists are on family leave [16].

Women physicians also face discrimination from both employers and patients [6,15,32]. Studies have demonstrated that gender biases, even while small and

**Table 2.** Associations between employment characteristics and gender.

<i>Differences between men (=0) and women (=1)</i>	Number of respondents	Univariate analysis (N=340)				Multivariate analysis (N=597)			
		Crude odds ratio	95% CI		p-Value	Adjusted odds ratio	95% CI		p-Value
<i>Practice status<sup>a</sup></i>	337								
Employed by an organization	221	1				1			
Independent practice	126	0.74	0.47	1.16	0.184	1.01	0.62	1.63	0.983
<i>Weekly work hours<sup>a</sup></i>	337								
40 h a week or less	116	1				1			
More than 40 h a week	221	0.88	0.56	1.38	0.573	0.78	0.48	1.27	0.319
<i>Weekly workdays<sup>a</sup></i>	337								
5 days a week or less	262	1				1			
More than 5 days a week	75	0.93	0.55	1.56	0.782	0.98	0.56	1.71	0.943
<i>Worked weekends a year<sup>a</sup></i>	338								
None	104	1				1			
Works weekends	234	1.28	0.80	2.05	0.305	1.03	0.62	1.70	0.909
<i>Reasonable income<sup>b</sup></i>	338								
Otherwise	167	1				1			
Income is reasonable (somewhat/extremely reasonable)	171	0.48	0.31	0.75	0.001	0.43	0.27	0.68	<0.001
<i>Compensation type: salary only<sup>b</sup></i>	338								
No	237	1				1			
Yes	101	1.12	0.70	1.79	0.636	1.13	0.68	1.89	0.635
<i>Compensation type: salary with bonus<sup>b</sup></i>	338								
No	228	1				1			
Yes	110	1.12	0.71	1.78	0.616	1.02	0.62	1.68	0.943
<i>Compensation type: pure production<sup>b</sup></i>	338								
No	268	1				1			
Yes	70	0.64	0.37	1.11	0.116	0.73	0.39	1.39	0.341
<i>Bonus type: net collections<sup>b</sup></i>	227								
No	154	1				1			
Yes	73	0.89	0.50	1.59	0.695	0.99	0.52	1.89	0.983
<i>Bonus type: quality metrics<sup>b</sup></i>	227								
No	158	1				1			
Yes	69	1.44	0.81	2.57	0.216	1.30	0.70	2.43	0.406
<i>Bonus type: gross billings<sup>b</sup></i>	227								
No	214	1				1			
Yes	13	1.46	0.48	4.51	0.506	1.82	0.55	6.04	0.325
<i>Bonus type: RVUs<sup>b</sup></i>	227								
No	151	1				1			
Yes	76	1.72	0.98	3.03	0.058	1.59	0.84	2.99	0.153
<i>Employment benefits<sup>b</sup></i>	338								
Otherwise	27	1				1			
Has benefits	311	1.29	0.57	2.90	0.543	0.79	0.32	1.95	0.603
<i>Benefit type: health insurance<sup>b</sup></i>	311								
No	62	1				1			
Yes	249	0.98	0.56	1.71	0.935	0.57	0.30	1.11	0.097
<i>Benefit type: malpractice insurance<sup>b</sup></i>	311								
No	39	1				1			
Yes	272	1.24	0.63	2.48	0.533	0.94	0.44	2.00	0.872
<i>Benefit type: retirement (401k, pension, etc.)<sup>b</sup></i>	311								
No	48	1				1			
Yes	263	1.63	0.85	3.11	0.140	1.05	0.50	2.19	0.907
<i>Benefit type: disability insurance<sup>b</sup></i>	311								

(Continued)

Table 2. Continued.

Differences between men (=0) and women (=1)	Number of respondents	Univariate analysis (N=340)			Multivariate analysis (N=597)				
		Crude odds ratio	95% CI		p-Value	Adjusted odds ratio	95% CI		p-Value
No	134	1				1			
Yes	177	1.52	0.96	2.40	0.074	1.33	0.80	2.21	0.274
Benefit type: dental insurance <sup>b</sup>	311								
No	106	1				1			
Yes	205	1.32	0.82	2.12	0.260	0.83	0.47	1.47	0.521
Benefit type: life insurance <sup>b</sup>	311								
No	140	1				1			
Yes	171	1.26	0.80	1.98	0.320	0.92	0.56	1.53	0.759
Benefit type: educational loan forgiveness <sup>b</sup>	311								
No	297	1				1			
Yes	14	1.34	0.46	3.91	0.594	1.12	0.35	3.54	0.848
COVID-19 affected participant's 2020 income compared to previous year <sup>b</sup>	338								
Otherwise	182	1				1			
Yes (income was much/slightly lower)	156	0.80	0.52	1.24	0.325	0.96	0.58	1.57	0.860
Educational debt <sup>b</sup>	337								
No debt	264	1				1			
Has school debt	73	3.42	1.98	5.89	<0.001	2.35	1.23	4.50	0.010

<sup>a</sup>In multivariate model, results are adjusted for race, age, specialty and practice status.

<sup>b</sup>In multivariate model, results are adjusted for race, age, weekly work hours, specialty and practice status.

Table 3. Associations between income and gender.

Variables	Model 1	Model 2
	ln(2020 pre-tax income)	ln(projected 2021 pre-tax income)
Female	-0.378*** (0.0693)	-0.338*** (0.0701)
Work hours	0.455*** (0.0786)	0.452*** (0.0842)
Race	0.0384* (0.0217)	0.0393* (0.0220)
Age	-0.121** (0.0471)	-0.138*** (0.0477)
Specialty	0.00616 (0.00658)	0.00817 (0.00687)
Practice status	0.00939 (0.0141)	0.0108 (0.0152)
Constant	12.36*** (0.149)	12.37*** (0.154)
Observations	323	319
R-squared	0.197	0.167

Robust standard errors in parentheses.

\* $p < 0.1$ .

\*\* $p < 0.05$ .

\*\*\* $p < 0.01$ .

unconscious, can impact women's careers in meaningful ways at many points, including hiring, salary, and promotion decisions [6,33]. These biases are amplified when women are mothers [6,31,34]. In addition to implicit bias, sexual harassment plays a role, affecting nearly a third of women clinician-researchers [32]. Patients bring biases into the clinical setting as well, expecting certain characteristics of care—longer visits,

more patient-centred communication—from their female providers [35]. Institutions should provide training to address implicit and explicit bias to all clinicians, particularly those in leadership positions [36].

At the level of insurance structure and policy, the system of reimbursement in the United States places emphasis on volume rather than quality clinical care or outcomes [26,37,38]. In the primary care setting, female physicians generate less visit revenue and a comparatively lower volume of visits than their male counterparts, but spend more time in direct patient care per visit, per day, and per year [39]. Women physicians tend to spend more time with their individual patients and use more patient-centered communication, perhaps in part due to patient expectations [37,40–42]. However, volume- and procedure-based reimbursement structures disincentivize such an approach [38]. In addition to spending more time with their patients [41], female primary care physicians document more diagnoses [42] and place more orders. This leads to female physicians spending half an hour more each day in the electronic health record, equivalent to three additional 40-hour-work weeks per year [43]. This potentially contributes to burnout disparities in addition to wage disparities.

As has been suggested [15,26,37,39,44], this difference in paradigms of care presents an opportunity for reform as health systems move towards time- and

value-based billing and other compensation models that account for measures of outcomes and patient experience. The changes that are already happening are both necessary and important, but it takes time and effort from all stakeholders for meaningful systemic change. Until then, there are possible solutions that operate within the existing paradigm, such as understanding patterned variations in patient expectations and providing more options in visit length for patients who have more psychosocial concerns or care coordination needs and then coding appropriately for counselling [35].

On the level of field of medicine more broadly, there exist pay gaps between specialties. Female representation tends to be greater in specialties that compensate less, such as primary care, and within individual specialties, female physicians tend to favor less procedure-heavy subspecialties [37]. Put another way, the specialties that have a greater proportion of women are also the specialties that pay less to all physicians within that specialty [8]. The underlying factors for why women pursue less procedural specialties even as early as medical school are not well understood and elucidating and addressing these reasons may be a first step in closing the pay gap [45]. But even after accounting for differences in specialty choice, the gender pay gap is persistent *within* specialties and their subspecialties [2,7,37,46,47].

At the level of the medical institution, particularly in academic contexts, women physicians often face barriers to financial advancement at various points in their careers. Awareness of existence and extent of the problem is necessary in order to address the problem, and thus salary transparency is essential in addressing the gender pay gap [9,36]. This means making hiring and promotion practice data—including starting salaries and pay raises—available on the aggregate and institutional level, stratified by gender and other demographic characteristics [36]. The American Medical Association, the American College of Physicians, and other physician groups have taken the first steps towards this goal by crafting new policies to promote pay transparency [2]. Given that the pay gap is established early on with starting salaries, institutions should seek to achieve gender-neutral equality in starting salaries, as well as salary growth rates and pay raises [2]. Women may also place less emphasis on salary negotiation during initial hiring and subsequent salary increase negotiations. Given that residency programs typically lack formalized training in negotiation skills, incorporating such skills into training may help all trainees, particularly women [15].

Even after acquiring their initial positions, women experience greater lag time before promotion and

tenure, as well as less representation in leadership roles [20,48]. Gender equity initiatives should involve active recruitment of women in leadership positions and the thoughtful provision of mentorship and sponsorship [36]. Targeted mentorship programs like the one developed by the Society of General Internal Medicine, which pairs women early in their academic medicine careers with senior faculty members over a formalized two-year relationship focused on career advancement [45], allow for personalized support. Institutional support is critical as “bottom-up” approaches that rely on the additional labour of the people the programs are designed to support result in less efficacy [49]. Top-down approaches that begin with leadership have a higher likelihood of success [50].

Strengths of this study include that its ability to leverage the extensive database of the Maryland Medical Society—over 10,000 physicians—and that it was able to provide cross-sectional data from two years, 2016 and 2020, before and during/after the pandemic. Limitations include the survey model, which relies on cross-sectional and self-reported information, particularly when projecting income. Furthermore, only a subset of physicians completed the survey and there may have been duplicate emails in the physician database, factors which both led to a smaller sample size and, accordingly, greater confidence interval. There is a self-selection bias in the data in that those who chose to respond to the survey may be different than those who did not, which means that these results may be over- or underestimating the gender pay gap. Finally, while some of the questions on the 2016 and 2020 surveys were the same, the surveys were not identical.

## Conclusion

In Maryland, there exists a significant physician gender pay gap that has remained persistent the last several years and is compounded by a gender gap in educational debt. Evaluating the current state of gender pay equity in medicine is imperative, particularly as we think about and implement potential solutions.

## Acknowledgements

The authors would like to thank the members of the Maryland Medical Society.

## Authors contributions

AZ, CL and PR were all involved in the analysis and interpretation of the data, the drafting of the paper and the



critical revision. AZ, CL, CO, CJ and PR participated in the final approval of the version to be published. AZ, CL, CO, CJ and PR agree to be accountable for all aspects of the work.

## Disclosure statement

The authors report no conflict of interest.

## Funding

No funding was received. MedChi paid a flat fee to Merritt Hawkins to administer the surveys.

## ORCID

Ashley Zhou  <http://orcid.org/0000-0002-3678-1166>

## Data availability statement

The data that support the findings of this study are available from the corresponding author, PR, upon reasonable request.

## References

- [1] Lo Sasso AT, Richards MR, Chou CF, et al. The \$16,819 pay gap for newly trained physicians: the unexplained trend of men earning more than women. *Health Aff.* 2011;30(2):1–11. doi: 10.1377/hlthaff.2010.0597.
- [2] Catenaccio E, Rochlin JM, Simon HK. Addressing gender-based disparities in earning potential in academic medicine. *JAMA Netw Open.* 2022;5(2):e220067. doi: 10.1001/jamanetworkopen.2022.0067.
- [3] Frintner MP, Sisk B, Byrne BJ, et al. Gender differences in earnings of early- and midcareer pediatricians. *Pediatrics.* 2019;144(4):e20183955. doi: 10.1542/peds.2018-3955.
- [4] Weeks WB, Wallace AE. Race and gender differences in general internists' annual incomes. *J Gen Intern Med.* 2006;21(11):1167–1171. doi: 10.1111/j.1525-1497.2006.00592.x.
- [5] Seabury SA, Chandra A, Jena AB. Trends in the earnings of male and female health care professionals in the United States, 1987 to 2010. *JAMA Intern Med.* 2013;173(18):1748–1750. doi: 10.1001/jamainternmed.2013.8519.
- [6] Jaggi R, Griffith KA, Stewart A, et al. Gender differences in the salaries of physician researchers. *JAMA.* 2012;307(22):2410–2417. doi: 10.1001/jama.2012.6183.
- [7] Spencer ES, Deal AM, Pruthi NR, et al. Gender differences in compensation, job satisfaction and other practice patterns in urology. *J Urol.* 2016;195(2):450–455. doi: 10.1016/j.juro.2015.08.100.
- [8] Bravender T, Selkie E, Sturza J, et al. Association of salary differences between medical specialties with sex distribution. *JAMA Pediatr.* 2021;175(5):524–525. doi: 10.1001/jamapediatrics.2020.5683.
- [9] Jena AB, Olenski AR, Blumenthal DM. Sex differences in physician salary in US public medical schools. *JAMA Intern Med.* 2016;176(9):1294–1304. doi: 10.1001/jamainternmed.2016.3284.
- [10] Staiger DO, Auerbach DI, Buerhaus PI. Trends in the work hours of physicians in the United States. *JAMA.* 2010;303(8):747–753. doi: 10.1001/jama.2010.168.
- [11] Warner AS, Lehmann LS. Gender wage disparities in medicine: time to close the gap. *J Gen Intern Med.* 2019;34(7):1334–1336. doi: 10.1007/s11606-019-04940-9.
- [12] Baker LC. Differences in earnings between male and female physicians. *N Engl J Med.* 1996;334(15):960–964. doi: 10.1056/NEJM199604113341506.
- [13] Ohsfeldt RL, Culler SD. Differences in income between male and female physicians. *J Health Econ.* 1986;5(4):335–346. doi: 10.1016/0167-6296(86)90008-1.
- [14] Weeks WB, Wallace TA, Wallace AE. How do race and sex affect the earnings of primary care physicians? *Health Aff.* 2009;28(2):557–566. doi: 10.1377/hlthaff.28.2.557.
- [15] Ly DP, Seabury SA, Jena AB. Differences in incomes of physicians in the United States by race and sex: observational study. *BMJ.* 2016;353:i2923. doi: 10.1136/bmj.i2923.
- [16] Mascarenhas A, Moore JE, Tricco AC, et al. Perceptions and experiences of a gender gap at a Canadian research institute and potential strategies to mitigate this gap: a sequential mixed-methods study. *CMAJ Open.* 2017;5(1):E144–E151. doi: 10.9778/cmajo.20160114.
- [17] Rimmer A. Five facts about the gender pay gap in UK medicine. *BMJ.* 2016;354:i3878. doi: 10.1136/bmj.i3878.
- [18] Okoshi K, Nomura K, Taka F, et al. Suturing the gender gap: income, marriage, and parenthood among Japanese surgeons. *Surgery.* 2016;159(5):1249–1259. doi: 10.1016/j.surg.2015.12.020.
- [19] Ness RB, Ukoli F, Hunt S, et al. Salary equity among male and female internists in Pennsylvania. *Ann Intern Med.* 2000;133(2):104–110. doi: 10.7326/0003-4819-133-2-2000-7180-00009.
- [20] Rotbart HA, McMillen D, Taussig H, et al. Assessing gender equity in a large academic department of pediatrics. *Acad Med.* 2012;87(1):98–104. doi: 10.1097/ACM.0b013e31823be028.
- [21] Hoops HE, Brasel KJ, Dewey E, et al. Analysis of gender-based differences in surgery faculty compensation, promotion, and retention: establishing equity. *Ann Surg.* 2018;268(3):479–487. doi: 10.1097/SLA.0000000000002920.
- [22] Wright AL, Schwindt LA, Bassford TL, et al. Gender differences in academic advancement: patterns, causes, and potential solutions in one US college of medicine. *Acad Med.* 2003;78(5):500–508. doi: 10.1097/00001888-200305000-00015.
- [23] Ranasinghe PD, Zhou A. Women physicians and the COVID-19 pandemic: gender-based impacts and potential interventions. *Ann Med.* 2023;55(1):319–324. doi: 10.1080/07853890.2022.2164046.
- [24] Kurtz J. Survey shows large pay gap between male and female physicians in Maryland. *Maryland Matters.* 2023. Available from: <https://www.marylandmatters.org/2018/08/01/survey-shows-large-pay-gap-between-male-and-female-physicians-in-maryland/>
- [25] Kang L, Ma S, Chen M, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: a cross-sectional study. *Brain Behav Immun.* 2020;87:11–17. doi: 10.1016/j.bbi.2020.03.028.
- [26] Ganguli I, Mulligan KL, Phillips RL, et al. How the gender wage gap for primary care physicians differs by

- compensation approach: a microsimulation study. *Ann Intern Med.* 2022;175(8):1135–1142. doi: 10.7326/M22-0664.
- [27] Apaydin EA, Chen PGC, Friedberg MW. Differences in physician income by gender in a multiregion survey. *J Gen Intern Med.* 2018;33(9):1574–1581. doi: 10.1007/s11606-018-4462-2.
- [28] Muench U, Sindelar J, Busch SH, et al. Salary differences between male and female registered nurses in the United States. *JAMA.* 2015;313(12):1265–1267. doi: 10.1001/jama.2015.1487.
- [29] Ly DP, Jena AB. Sex differences in time spent on household activities and care of children among US physicians, 2003–2016. *Mayo Clin Proc.* 2018;93(10):1484–1487. doi: 10.1016/j.mayocp.2018.02.018.
- [30] Lachish S, Svirko E, Goldacre MJ, et al. Factors associated with less-than-full-time working in medical practice: results of surveys of five cohorts of UK doctors, 10 years after graduation. *Hum Resour Health.* 2016;14(1):62. doi: 10.1186/s12960-016-0162-3.
- [31] Frank E, Zhao Z, Sen S, et al. Gender disparities in work and parental status among early career physicians. *JAMA Netw Open.* 2019;2(8):e198340. doi: 10.1001/jamanetworkopen.2019.8340.
- [32] Jagsi R, Griffith KA, Jones R, et al. Sexual harassment and discrimination experiences of academic medical faculty. *JAMA.* 2016;315(19):2120–2121. doi: 10.1001/jama.2016.2188.
- [33] Morgan AU, Chaiyachati KH, Weissman GE, et al. Eliminating gender-based bias in academic medicine: more than naming the “elephant in the room”. *J Gen Intern Med.* 2018;33(6):966–968. doi: 10.1007/s11606-018-4411-0.
- [34] Jolly S, Griffith KA, DeCastro R, et al. Gender differences in time spent on parenting and domestic responsibilities by high-achieving young physician-researchers. *Ann Intern Med.* 2014;160(5):344–353. doi: 10.7326/M13-0974.
- [35] Linzer M, Harwood E. Gendered expectations: do they contribute to high burnout among female physicians? *J Gen Intern Med.* 2018;33(6):963–965. doi: 10.1007/s11606-018-4330-0.
- [36] Cohen M, Kiran T. Closing the gender pay gap in Canadian medicine. *CMAJ.* 2020;192(35):E1011–E1017. doi: 10.1503/cmaj.200375.
- [37] Valle L, Weng J, Jagsi R, et al. Assessment of differences in clinical activity and medicare payments among female and male radiation oncologists. *JAMA Netw Open.* 2019;2(3):e190932. doi: 10.1001/jamanetworkopen.2019.0932.
- [38] Sinsky CA, Dugdale DC. Medicare payment for cognitive vs procedural care: minding the gap. *JAMA Intern Med.* 2013;173(18):1733–1737. doi: 10.1001/jamainternmed.2013.9257.
- [39] Ganguli I, Neprash HT. Physician work hours and the gender pay gap—evidence from primary care. Reply. *N Engl J Med.* 2020;383(27):2688–2689. doi: 10.1056/NEJMc2032395.
- [40] Roter DL, Hall JA, Aoki Y. Physician gender effects in medical communication: a meta-analytic review. *JAMA.* 2002;288(6):756–764. doi: 10.1001/jama.288.6.756.
- [41] Jefferson L, Bloor K, Birks Y, et al. Effect of physicians’ gender on communication and consultation length: a systematic review and meta-analysis. *J Health Serv Res Policy.* 2013;18(4):242–248. doi: 10.1177/1355819613486465.
- [42] Roter DL, Hall JA. Physician gender and patient-centered communication: a critical review of empirical research. *Annu Rev Public Health.* 2004;25(1):497–519. doi: 10.1146/annurev.publhealth.25.101802.123134.
- [43] Tait SD, Oshima SM, Ren Y, et al. Electronic health record use by sex among physicians in an academic health care system. *JAMA Intern Med.* 2021;181(2):288–290. doi: 10.1001/jamainternmed.2020.5036.
- [44] Lasser KE, Woolhandler S, Himmelstein DU. Sources of U.S. physician income: the contribution of government payments to the specialist-generalist income gap. *J Gen Intern Med.* 2008;23(9):1477–1481. doi: 10.1007/s11606-008-0660-7.
- [45] Roy B. Gender pay gaps in medicine: moving from explanations to action. *J Gen Intern Med.* 2018;33(9):1413–1414. doi: 10.1007/s11606-018-4579-3.
- [46] Wiler JL, Rounds K, McGowan B, et al. Continuation of gender disparities in pay among academic emergency medicine physicians. *Acad Emerg Med.* 2019;26(3):286–292. doi: 10.1111/acem.13694.
- [47] Jagsi R, Biga C, Poppas A, et al. Work activities and compensation of male and female cardiologists. *J Am Coll Cardiol.* 2016;67(5):529–541. doi: 10.1016/j.jacc.2015.10.038.
- [48] Kaplan SH, Sullivan LM, Dukes KA, et al. Sex differences in academic advancement. Results of a national study of pediatricians. *N Engl J Med.* 1996;335(17):1282–1289. doi: 10.1056/NEJM199610243351706.
- [49] Laver KE, Prichard IJ, Cations M, et al. A systematic review of interventions to support the careers of women in academic medicine and other disciplines. *BMJ Open.* 2018;8(3):e020380. doi: 10.1136/bmjopen-2017-020380.
- [50] Valentine HA, Grewal D, Ku MC, et al. The gender gap in academic medicine: comparing results from a multifaceted intervention for Stanford faculty to peer and national cohorts. *Acad Med.* 2014;89(6):904–911. doi: 10.1097/ACM.0000000000000245.