RESEARCH ARTICLE

Gender Discrepancies in Neurologist Compensation

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Neurology® 2022;98:e893-e902. doi:10.1212/WNL.0000000000013281

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Abstract

Background and Objectives

Previous studies have shown gender disparities in physician pay in various specialties. This retrospective, cross-sectional study evaluated data from the American Academy of Neurology (AAN) Compensation and Productivity Survey for differences in neurologist compensation by gender.

Methods

Of the 3,268 completed surveys submitted, 2,719 were from neurologists and 1,466 had sufficient data for analysis (551 women, 951 men respondents). We calculated an hourly wage from full-time equivalent (FTE) status and weeks worked per year. We evaluated differences in men and women neurologist compensation with multivariable generalized linear models adjusting for race, ethnicity, geographic region, practice setting, years in practice, call status, leadership role, straight salary, and subspecialty.

Results

Baseline characteristics for men and women neurologists were similar with the exception of subspecialty distribution. More men were practicing in higher-wage subspecialties compared to women ($p < 0.05$). Mean FTE annual salary for all neurologists was $280,315, and mean standardized hourly compensation was $131. Estimated annual salary for women was 10.7% less ($p \le 0.001$, 95% confidence interval −4% to −16%) after controlling for race, region, years of practice, practice setting, call status, leadership role, and subspecialty-wage category. FTE annual salary for women neurologists in high-compensation specialties ($281,838) was lower than the mean annual salary for men neurologists in both high-compensation ($365,751) and low-compensation subspecialties ($282,813). When broken down by years of practice, the highest earning women neurologists' mean hourly wage (11–20 years of practice, $128/h) was less than that of all men neurologists except those with 0 to 5 years of practice ($125/h).

Discussion

This study, using convenience sample data, adds to the existing body of evidence demonstrating that, despite adjustment for multiple confounding variables, ongoing disparities exist in physician compensation. Despite efforts by professional societies such as the AAN, ongoing systemic issues and barriers exist. Further research into underlying causes and mitigation strategies is recommended; use of probability sampling methods in future research will be important to decrease potential bias and to increase generalizability.

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This manuscript was approved by the AAN's Medical Economics and Practice Committee on July 12, 2021, and by the AAN and AAN Institute Boards of Directors on August 19, 2021.

Go to Neurology.org/N for full disclosures. Funding information and disclosures deemed relevant by the authors, if any, are provided at the end of the article.

Glossary

AAN = American Academy of Neurology; **APP** = advanced practice provider; **FTE** = full-time equivalent.

In 2019, women who were full-time wage and salary workers had median weekly earnings equal to 82% of men's, representing an improvement from 1979 when women earned 62% of men's compensation, demonstrating that gender pay equality remains elusive.[1] Despite the investment in time and money for a medical degree and subsequent training, physician salaries are not immune from this phenomenon.[1] Studies, including a recently published systemic review,[2] have shown income gender disparities in medical and surgical specialties.[3-6] A study of academic physician salaries found that women neurologists earned the least amount annually among men and women specialty physicians.[5] Men neurologists were paid substantially more, despite adjustment for multiple factors including age, years of experience, faculty rank, authorship, NIH funding, clinical trial participation, and Medicare reimbursements, with women neurologist pay equating to 85 cents for every dollar earned by their men counterparts.[5]

The American Academy of Neurology (AAN) has conducted a biennial Compensation and Productivity Survey of its members since 2013 to provide benchmarking data for salaries, benefits, and workload in a variety of practice settings. Knowledge of the labor force and market power of neurologists is vital for advocacy of neurology as a physician specialty, and the data provided help AAN members see where they rank among their colleagues. Participation is voluntary and selection is nonrandom, but the proportion of AAN membership represented by the survey has grown markedly every year and includes thousands of members. The AAN does not represent or warrant the accuracy of the data in the AAN's 2019 Compensation and Productivity Survey or any outcomes based on the use of the data. In addition, because the AAN does not provide any legal or financial advice, the report and publications based on the use of the data should not be construed to offer such advice. We examined data from the 2019 Compensation and Productivity Survey to assess the effect of gender on neurologist pay to test our hypothesis that women neurologists' financial compensation would be less than that of men neurologists.

Methods

Overview

We performed a retrospective, cross-sectional analysis of financial compensation of women vs men neurologists in the United States using data from the 2019 AAN Neurology Compensation and Productivity survey, collected via an online survey made available to current US neurologist, advanced practice provider (APP), and business administrator members of the AAN from March 11, 2019, to May 25, 2019. The primary objective was to determine whether neurologist compensation differed significantly by gender after adjustment for potential confounders. In reporting the results of our study in this article, we followed the Strengthening the Reporting of Observational Studies in Epidemiology initiative recommendations for cross-sectional studies.

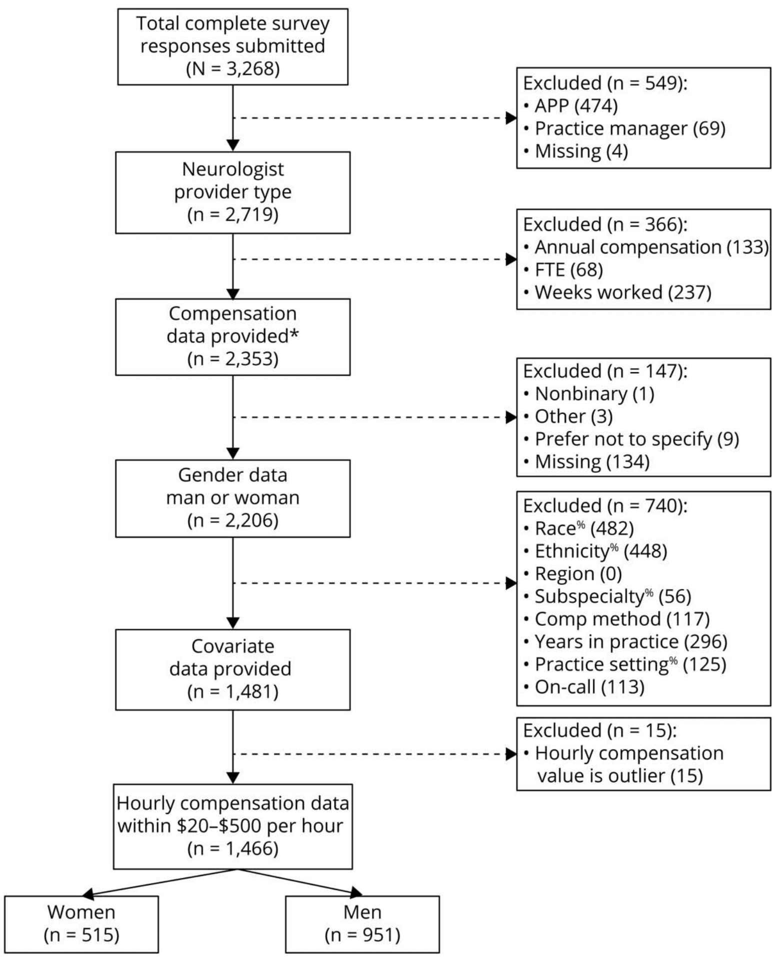
Dataset, Setting, and Included Study Population

The AAN Neurology Compensation and Productivity survey is a biennial survey of AAN members residing in the United States, including neurologists, APPs, and neurology practice managers. Of the 15,702 AAN members who received an email invitation to participate in the 2019 survey, 3,268 completed surveys were submitted. Because the focus of this study was compensation of physicians, neurology practice managers and APPs were excluded from the study sample (n = 543). For the purposes of this study, we refer to gender as a self-identified binary construct of man or woman. Gender categories other than man and woman were not included in this analysis due to the very small number of participants (n < 20 indicated "other," "nonbinary," or "prefer not to specify"). Data from participants who had missing values for the outcome variable or other covariates were excluded as well, with the exception of those participants who had a missing response for leadership role; missing values for this variable were recoded to "no leadership role." Of the 2,719 neurologist responses, 1,253 were excluded due to missing values or compensation falling above or below the upper and lower cutoffs for outliers (Figure), leaving 515 and 951 responses from women and men, respectively, for inclusion in the analysis.

Outcome

The survey defined annual compensation as "the amount of compensation reported in Box 5 of the W2 and/or Box 19 of the K1." If the respondent received both, the survey instructions stated that the sum of the W2 and K1, which this includes 401(k) should be reported. There was considerable variation in participants' full-time equivalent (FTE) status (0.1–1.0 FTE) and weeks worked per year (8–52 weeks), which directly affected reported annual compensation. To include as many participants as possible and to more easily interpret the results of the analysis, we estimated annual compensation across variation in FTE status and weeks worked, creating a new variable: standardized hourly compensation rate (hourly wage). This variable assumes a 50-hour workweek, comparable to previous model parameters for the neurology workforce.[7]

Figure Flow Diagram of Population Included in Analysis



APP = advanced practice provider; Comp = compensation; FTE = full-time equivalent.

Hourly compensation was calculated by dividing a participant's annual compensation by the product of 50 h/wk, number of weeks worked in the year, and proportion FTE (1 = full-time): hourly compensation rate = annual compensation/(50 h/wk × weeks worked per year × FTE). We back-calculated estimated annual salary as the product of the calculated hourly compensation rate, 50 h/wk, and weeks worked per year. Due to outlier values, including the full range of standardized hourly wage values resulted in significant right skew of the distribution. Because the number of outliers was small (<2% of final sample), we excluded compensation values ≤$20/h and those ≥$500/h from the analysis.

Exposure

Our primary independent variable of interest was gender. We included additional variables in the model to adjust for possible confounding and effect modification, including race, ethnicity (Hispanic/non-Hispanic), US Census Bureau geographic region,[8] practice setting, years in practice, leadership role, on-call duties, straight salary, and subspecialty. While employment status, benefits received in respondents' compensation package, and community size are also associated with compensation, we excluded these from the model due to a high incidence of missing values (>50%) for these variables.

We simplified data elements when possible, grouping responses within variables to form categories (practice setting, years in practice, compensation method, and subspecialty) when the raw survey response terms had similar implications or combining response terms when they represented very small sample sizes (e.g., race) (Tables 1 and 2). Interaction terms were included for variables with suspected impact on gender to capture effect modification (subspecialty, setting, race) and an interaction term for subspecialty and wage, which are known to be associated. Given the large number of subspecialties, we dichotomized the subspecialty variable by hourly wage compensation, taking advantage of a natural cut point at $150/h to create 2 possible categorical values (high and mid/low compensation).

Statistical Analysis

To explore the association between the gender and neurologist compensation, we included descriptive and inferential statistics in our analysis. We described baseline demographic characteristics

Table 1 Descriptive Characteristics of Survey Respondents Included in Analytic Sample

	Men	Women	*p* Value
Gender, % (n)	64.9 (951)	35.1 (515)	
Age, median [range], (n)	48 [29–85] (899)	44 [21–79] (467)	NA
Race, % (n)			0.25
White	70.7 (672)	67.8 (349)	
Non-White	29.34 (279)	32.23 (166)	
Asian	26.2 (249)	28.0 (144)	
Black or African American	1.8 (17)	3.5 (18)	
American Indian or Alaska Native	0.6 (6)	0.6 (3)	
Native Hawaiian or Other Pacific Islander	0.7 (7)	0.2 (1)	
Ethnicity, % (n)			0.54
Hispanic or Latino	5.26 (50)	6.0 (31)	
Not Hispanic or Latino	94.74 (901)	94.0 (484)	
Years in practice, median [range] (n)	14.6 [0–56] (951)	10.7 [1–50] (515)	NA
Years in practice, categorical, % (n)			<0.001
0–5	29.4 (280)	32.8 (169)	
6–10	18.3 (174)	28.5 (147)	
11–20	22.9 (218)	25.4 (131)	
≥20	29.3 (279)	13.2 (68)	
Leadership position within a hospital or university, % (n)			0.26
Did not have a leadership position	45.0 (312)	46.3 (156)	
Director	29.0 (201)	30.3 (102)	
Chief of division	16.0 (111)	11.6 (39)	
Other	10.0 (69)	11.9 (48)	
Leadership position (binary), % (n)			0.07
Does not have leadership position	59.9 (570)	64.9 (334)	
Has leadership position	40.1 (381)	35.2 (181)	
On-call duties, % (n)			0.34
Yes	80.6 (766)	78.5 (404)	
No	19.5 (185)	21.6 (111)	
Took extended leave of absence in 2018, % (n)	3.2 (27)	8.7 (38)	<0.001
Extended leave of absence, mean (range), d (n)	40.4 [5–125] (n = 27)	58.7 [5–300] (38)	0.13

Abbreviation: NA = not applicable.
Significance tested by χ^2 for proportions and Student *t* test for means.

and compensation values across participant gender. We used the Pearson χ^2 test for categorical variables and 2-sided Student *t* tests for means of continuous variables (Tables 1–3). We performed a modified Park test[9] on the hourly wage data, suggesting a gamma distribution for modeling wage, and thus created a multivariable generalized linear model (gamma family) with log link to analyze the association between gender and estimated annual compensation of US neurologists. To adjust for potential confounders, including years of practice and leadership role, we included them in the final model. We created postestimation margins from the model results and reverse-transformed the predicted wage outcome to an estimated annual equivalent salary. Significance for all

Table 2 Descriptive Practice and Subspecialty Characteristics of Survey Respondents Included in Analytic Sample

	Men, % (n)	Women, % (n)	*p* Value
Practice setting			<0.001
Academic medical center–based group	53.9 (513)	66.8 (344)	
Government-based group	1.9 (18)	1.9 (10)	
Hospital-based group	16.7 (159)	12.0 (62)	
Multispecialty group	9.3 (88)	6.8 (35)	
Neurology group	11.9 (113)	8.4 (43)	
Solo practice	5.4 (51)	2.1 (11)	
Other	0.7 (7)	1.4 (7)	
No clinical practice	0.2 (2)	0.6 (3)	
Practice setting, categorical			<0.001
Academic or government	55.8 (531)	68.7 (354)	
Nonacademic or government	44.2 (420)	31.3 (161)	
Region			0.15
Northeast	33.0 (314)	38.1 (196)	
West	15.1 (144)	15.0 (77)	
South	33.1 (315)	32.0 (165)	
Midwest	18.7 (178)	15.0 (77)	
Primary specialty/subspecialty			0.001
General neurology	23.3 (222)	17.5 (90)	
Epilepsy	8.7 (83)	12.4 (64)	
Vascular neurology and stroke	11.2 (106)	10.1 (52)	
Child neurology	6.9 (66)	10.7 (55)	
Neuromuscular medicine	7.9 (77)	8.2 (42)	
Movement disorders	6.1 (58)	8.0 (41)	
Neurocritical care	5.6 (53)	5.4 (28)	
Neuroimmunology and multiple sclerosis	3.8 (36)	3.7 (19)	
Neurohospitalist	6.5% (62)	4.1% (21)	
Subspecialty-wage category			0.002
High-compensation subspecialty	15.7 (149)	9.9 (51)	
Low/medium-compensation subspecialty	84.3 (802)	90.1 (464)	

Significance tested by χ^2 for proportions and Student t test for means. Regions are according to the US Census Bureau.

analyses was set at $p = 0.05$. All statistical testing was performed with Stata (StataCorp, College Station, TX).[10]

Sensitivity Analysis

We conducted sensitivity analyses to determine whether there was an association between subspecialty-hourly rate category (low or high) and (1) US region and (2) gender using the Pearson χ^2 test. We analyzed missing data, comparing the distribution of men and women, by each missing outcome or covariate, also using Pearson χ^2 test. We used *t* tests to determine whether the mean standardized hourly compensation and annual compensation differed significantly between men and women for all variables/groups.

Standard Protocol Approvals, Registrations, and Patient Consents

Because survey participation was voluntary and all data have been deidentified, the need for Institutional Review Board approval has been waived for this analysis.

Table 3 Descriptive Compensation Characteristics of Survey Respondents Included in Analytic Sample

	Men	Women	*p* Value
Total compensation in 2018, mean [range], $ (n)	302,674 [7,007–999,999] (951)	239,027 [26,971.80–800,000] (515)	<0.001
Primary method of compensation, % (n)			0.21
Equal share of practice compensation pool	1.0 (9)	0.6 (3)	
Productivity based only	8.6 (82)	6.2 (32)	
Straight/guaranteed salary	30.9 (294)	35.3 (182)	
Salary plus productivity	26.7 (254)	22.5 (116)	
Salary plus productivity and quality bonus	27.0 (257)	29.5 (152)	
Salary plus quality bonus	4.0 (38)	3.7 (19)	

Significance tested by χ^2 for proportions and Student *t* test for means.

Data Availability

In accordance with AAN's Antitrust Policy, the non-AAN staff authors had access only to aggregated data from the AAN's 2019 Compensation and Productivity Survey. The AAN owns and prohibits non-AAN staff from viewing raw data to preserve the confidentiality of the data and the individual or organization that submitted the data and in compliance with antitrust regulations.

Results

Characteristics of Men vs Women Neurologists

In our final sample of 1,466 neurologist survey respondents, 65% were men. Men and women exhibited moderate differences in mean years in practice and mean days of extended leave, subspecialty distribution, and leadership roles. Baseline characteristics are presented in Tables 1–3. There was not a significant difference in the proportion of men vs women neurologists for other variables.

Sensitivity Analyses

In our sensitivity analyses, we found a statistically significant difference in the proportion of men and women in the high subspecialty-wage category compared to the medium to low subspecialty-wage category, with 5.7% more men in high-wage subspecialties compared to women (Pearson $\chi^2 = 13.0$, $p < 0.05$). We did not find a statistically significant association between US geographic region and subspecialty-wage category, with proportion of neurologists in the high subspecialty-wage category ranging from 86.4% to 88.7% (Pearson $\chi^2 = 2.0$, $p > 0.05$). In our analysis of men and women with missing data, the distribution of men and women across variables was not different from those with no missing data who were included in the analysis.

Comparison of Compensation of Men and Women Neurologists

The mean estimated 1.0 FTE annual salary for all neurologists in the final sample was $280,315 ($7,007–$999,999), and the mean standardized hourly wage was $131/h ($22/h–$500/h). The differences between both men and women neurologists' mean annual salary and mean standardized hourly rates were statistically significant. In multivariable-adjusted analysis, we found that women neurologists' wages were 11.3% less than men neurologists' (95% confidence interval [CI] 4.6%–18.0% [$119/h vs $137/h]) and that women neurologists' annual FTE salary was 10.2% less (95% CI −16.0% to −4.3%) than men neurologists' annual FTE salary after controlling for race, region, years of practice, practice setting, call status, leadership role, and subspeciality-wage category.

In addition to gender, the relationships between compensation and the following 7 variables were statistically significant: leadership role status, race (White compared to non-White), compensation method, practice setting, years in practice, call status, and subspecialty (Table 4). Among both men and women, those in a leadership role received higher compensation than those in a nonleadership role (+4.9% greater [95% CI +4.4% to +5.4%]), and those in academic or government practice settings received lower compensation compared to those in other practice settings (hospital-based, multispecialty, and neurology group practices; solo practices, other practice setting; and those not in clinical practice). Notably, even among neurologists with leadership positions, men had substantially higher mean salaries ($315,000 vs $269,000), although this did not achieve statistical significance. Men in academic or government practice earned 21.6% less (95% CI −21.2% to −21.9%) than men in other practice settings, and women in academic or government practice earned 23.6% less (95% CI −21.6% to −25.2%) than women in other practice settings (Table 5).

Mean annual estimated salary for women neurologists in high-compensation subspecialties was $281,838 (95% CI $251,881–$311,795), which was lower than the mean estimated salary for men neurologists in both high-compensation (mean $365,751 [95% CI $343,449–$388,053]) and low-compensation subspecialties (mean $282,813 [95% CI $275,414–$290,211]) (Table 5).

Table 4 Multivariable Model: Effects on Compensation (Percent Change) by Each Variable

Hourly rate covariates	Change estimate, %	95% CI	*p* Value
Gender: women	−10.7	−16.5 to −4.5	0.001
Race: non-White	+7.5	+1.0 to +14.3	0.02
Ethnicity: Hispanic	−4.7	−13.6 to +5.0	0.33
Region			
South	+3.9	−1.7 to +9.8	0.17
West	+0.9	−5.9 to +8.1	0.81
Midwest	+7.7	+0.8 to +15.1	0.03
Compensation method: not straight salary	+2.9	−2.07 to +8.02	0.26
Practice setting: not academic/government	+23.6	+16.31 to +31.32	<0.001
Years in practice			
5.1–10	+7.0	+0.48 to +13.88	0.04
10.1–20	+18.6	+11.47 to +26.18	<0.001
≥20.1	+18.5	+11.18 to +26.36	<0.001
Leadership role: yes	+5.2	+0.31 to +10.26	0.04
Call duties: yes	+10.0	+3.76 to +16.53	0.001
Subspecialty hourly wage: high	+40.7	+27.59 to +55.04	<0.001
Gender and setting (interaction)	+3.2	−6.42 to +13.78	0.53
Gender and race (interaction)	−4.3	−13.46 to +5.77	0.39
Gender and subspecialty hourly wage: high	−17.0	−28.36 to −3.86	0.01
Setting and high-compensation subspecialty	+17.6	+3.07 to +34.15	<0.001

Abbreviation: CI = confidence interval.

For both women and men, mean compensation increased up until 11 to 20 years in practice, at which point compensation plateaued, with a slight decrease compared to ≥21 years in practice. Across all 4 categories of years in practice, compensation for men was higher than compensation for women. Mean compensation values for all years in practice categories are presented in Table 5.

Discussion

In this analysis of the Neurology Compensation and Productivity Survey, we show a marked difference in compensation among men and women physicians practicing neurology. The survey respondents constitute a sizeable percentage of the neurologists who are members of the AAN, which itself represents >90% of neurologists in the United States.[11] While sampling was nonrandom, the size of the sample ensures that the data are likely to be representative and generalizable for US neurologists. The data, which include weeks worked and average hours per week, allowed the creation of variables that address some of the issues that have affected previous analyses. Because we looked at a standardized hourly compensation rate as our outcome of interest, the direct effects of extended leave and limited hours on overall salary do not confound our analysis. What we are left with is very much an apples-to-apples examination of hourly wage in neurologists by gender. The obvious contributors-leadership roles, practice setting, years in practice, and subspecialty effects are included in the final model but do not alter the conclusion that women are paid less than men for equivalent work as a neurologist.

Our findings add to the existing body of evidence of gender pay gaps generally and for physician compensation in particular. Gender pay inequity has been recognized since the 1960s, when the average pay for men was at least 40% higher than the mean pay for women.[12] While the pay gap has narrowed in subsequent decades, it has not completely closed.[13] In a survey of >1,800 academic physicians conducted in 1999, only 47% of women senior faculty had achieved a rank of full professor compared with 66% of their colleagues who are men after accounting for publications, hours worked, and years of experience.[14] Among new physicians entering practice from residency, a growing gender pay gap from $3,600 in 1999 to nearly $17,000 in 2008 was noted in

Table 5 Adjusted-Average Standardized Hourly Wage and Annual 1.0 FTE Compensation

	Persons in sample estimate, n	Hourly wage (95% CI), $	Annualized wage (95% CI), $
Man and White	672	134 (130–139)	287,000 (279,000–296,000)
Man and non-White race	279	144 (137–151)	309,000 (296,000–323,000)
Woman and White	349	118 (112–123)	253,000 (242,000–263,000)
Woman and non-White race	166	121 (113–129)	247,000 (232,000–262,000)
Man and low/medium–compensation Specialty	802	128 (124–132)	283,000 (275,000–290,000)
Man and high-compensation specialty	149	195 (181–209)	366,000 (343,000–388,000)
Woman and low/medium–compensation specialty	464	114 (110–119)	246,000 (237,000–255,000)
Woman high-compensation specialty	51	144 (127–162)	282,000 (252,000–312,000)
Man + Northeast region	314	133 (128–139)	286,000 (276,000–297,000)
Man + South region	315	139 (133–145)	297,000 (286,000–308,000)
Man + West region	144	135 (127–143)	294,000 (279,000–310,000)
Man + Midwest region	178	144 (136–152)	302,000 (288,000–317,000)
Woman + Northeast region	196	115 (109–121)	244,000 (234,000–255,000)
Woman + South region	165	120 (114–126)	254,000 (242,000–265,000)
Woman + West region	77	116 (108–124)	251,000 (237,000–266,000)
Woman + Midwest region	77	124 (116–132)	258,000 (244,000–272,000)
Man + 0–5 y of practice	280	125 (119–130)	263,000 (252,000–273,000)
Man + 6–10 y of practice	174	133 (126–140)	289,000 (276,000–301,000)
Man + 11–20 y of practice	218	148 (141–155)	318,000 (304,000–331,000)
Man + ≥20 y of practice	279	148 (141–155)	317,000 (304,000–331,000)
Woman + 0–5 y of practice	169	108 (102–113)	224,000 (214,000–234,000)
Woman + 6–10 y of practice	147	115 (109–121)	246,000 (234,000–258,000)
Woman + 11–20 y of practice	131	128 (120–135)	271,000 (258,000–284,000)
Woman + ≥20 y of practice	68	127 (120–135)	271,000 (256,000–285,000)
Man + not leadership role	570	134 (130–139)	280,000 (272,000–288,000)
Man + leadership role	381	141 (136–147)	315,000 (305,000–326,000)
Woman + not leadership role	334	116 (111–121)	239,000 (230,000–248,000)
Woman + leadership role	181	122 (116–128)	269,000 (257,000–281,000)
Man + academic/government practice	531	123 (119–128)	263,000 (254,000–271,000)
Man + other practice	420	157 (151–164)	340,000 (328,000–353,000)
Woman + academic/government practice	354	105 (101–110)	226,000 (217,000–235,000)
Woman + other practice	161	138 (129–147)	288,000 (271,000–305,000)

Abbreviations: CI = confidence interval; FTE = full-time equivalent.
Hourly wages are rounded to the nearest dollar and annualized wages to the nearest $1,000. Estimate is from final multivariable generalized linear model. Regions are according to the US Census Bureau.

New York State, despite adjustment for specialty and practice setting.[15] Even the gender composition of a physician practice may affect income, as witnessed in a survey of group practices in which physicians in male-dominated (the term "male" is used here for consistency with the article cited) groups (>90% men) earned $91,000 more in nonsurgical specialties and $149,000 more in surgical specialties than doctors in groups with ≤50% males.[16]

Following the trends in the workforce and among physicians, our study again demonstrates and elaborates on the gender pay gap in neurology. Examination of 2011–2013 public salary data in showed a gender pay gap of >$40,000 without adjustment among 449 academic neurologists.[5] The Medscape Physician Compensation Report stated that unadjusted women neurologists pay deficits of $37,000 in 2015 and $56,000 in 2019 compared to men neurologists, despite more patient care hours.[17] A salary survey of 175 physicians in the American Clinical Neurophysiology Society in 2017 revealed that only 4% of women respondents ranked in the high salary range compared to 22% of men.[18] Our study builds on these efforts by leveraging the membership of the AAN for a larger, more representative sample, examining differences in a standardized hourly wage that circumvents issues of part-time and part-year work, and adjusting for a large number of factors that could affect pay. The gender pay gap we identify is therefore robust to potential confounders, including salary changes due to practice location, leadership role, and subspecialty pay. Despite multivariable adjustment, we still show that among neurologists, women are earning just 89 cents for every dollar earned by a man, a smaller difference than in unadjusted analyses but still substantial.

Our analysis further highlights the value of a professional society in surveying its membership and helping to shed light on pay inequity among its members. Medical professional societies have a critical role in exposing gaps in treatment of its members by gender, race, and orientation. Gender disparities are not limited to pay; women physicians were underrepresented in awards given by the AAN.[19] A more recent analysis of gender representation in AAN awards and publications suggested approaching parity in representation[20]; however, this study included a broader population of nonneurologists and awards that were not aimed exclusively or primarily at individual physician recipients.[21] Academic medicine does not represent a haven for progress on these issues; women represent 40% of academic neurologists but only 20% of full professors of neurology and are underrepresented in leadership positions such as chairs and vice chairs.[22,23] Because academic leadership roles are often compensated as a percentage of total compensation/FTE, women who earn these positions may be compensated less for their leadership activities.

In 2017, the AAN's Gender Disparity Task Force set forth several recommendations, with a focus on leadership by example, education, mentorship, improved transparency, advocacy, and further research into this topic.[24] Similar recommendations were made by the American College of Physicians,[25] and a number of other medical specialty societies have also addressed this topic in recent years through a variety of mechanisms. The commitment by the editorial leadership of AAN journals to address bias with specific targets of inclusion[26] is commendable. However, achieving parity in these areas does not directly translate to parity in compensation, and as our results show, much work is left to be done. The underlying systemic issues and barriers to effecting change have been well described in recent literature.[22] While there are a number of ongoing initiatives by the AAN and others, this is not a problem with a single solution. Achievement of gender equity will require increased accountability by all key stakeholders, a systematic approach, and the use of clear and comprehensive metrics to assess progress.[22] As a recurring source of data that has grown in scope and participation since its inception, the Neurology Compensation and Productivity Survey has the potential to provide metrics to assess the impact of further interventions.

There are a number of limitations to our study. First, this is a convenience sample with a response rate of 20.4% (2,719 responses of an estimated 13,294 eligible neurologists); there may have been bias in survey response that could have affected the representativeness of the sample and the subsequent analyses. Second, we combined some categories in race due to small numbers. Third, we omitted nonbinary genders and those who selected "prefer not to answer" due to small numbers (<20). Fourth, missing data resulted in exclusion of some respondents, although our final sample was still substantial, and we did not see that respondents excluded due to missing data had responses that were different from the included sample in variables with complete information. Fifth, we assumed that no response to the question of a leadership position was equivalent to a negative response. Sixth, we acknowledge that our assumption of a 50-hour workweek may have resulted in a higher or lower compensation estimate for those who worked >50 h/wk or <50 h/wk. Last, our study is a post hoc data analysis of data that were not collected primarily for research purposes, although the study was designed to measure annual compensation, the primary outcome of our study.

Recognizing and defining the extent of the problem is merely the first step in solving issues of gender pay disparity. Awareness alone is not sufficient to address the underlying systemic factors that have contributed to this situation. The impact of specific mitigation strategies at both the local and national levels, including position papers, antibias programs, and calls for increased transparency in salary information and promotion data, needs to be rigorously studied. These are necessary initial measures, but unless they are shown to effect true change, they will ultimately be of little value. More research into the underlying causes of this persistent disparity is needed, including effects of patient panel makeup, coding and billing practices, and conscious and unconscious bias on the part of patients.

Acknowledgment
The authors thank Melissa Johnston-Gross, MS, for assistance in data gathering; Brandon Magliocco, MS, for technical assistance with initial data analysis; Terra Wiens, MPH, for technical assistance during the data analysis; and Molly Byrne, MPH, for technical assistance during the data analysis.

Study Funding
The authors report no targeted funding.

Disclosure

M.M. Yu, S.A. Merillat, and A.L. Weathers have no disclosures relevant to the manuscript. D.A. Evans is an officer and shareholder of NeuroNet Group Purchasing Organization and NeuroNet Pro, received honoraria for serving as a speaker for Biogen and Genentech, and received honoraria for serving on an advisory board for EMD Serono, Biogen, and Genentech. R. A. Wolf is employed by the AAN and has an immediate family member who has received compensation for serving as an employee of Blue Cross Blue Shield of Minnesota. J.P. Ney is a federal government employee; is an ad hoc consultant for Ceribell, Inc; is the medical director for Surgical Neuromonitoring, PLLC, and Surgical Neuromonitoring Associates; is a board member of the American Surgical Neurophysiologic Monitoring Society; and receives salary support from the VA Headache Center of Excellence Research and Evaluation Center. Go to Neurology.org/N for full disclosures.

Publication History

Received by *Neurology* August 23, 2021. Accepted in final form December 17, 2021.

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Shannon A. Merillat, MLIS, MPH	School of Public Health, University of Minnesota, Minneapolis	Designed and conceptualized the study; analyzed the data; drafted and revised the manuscript for intellectual content
Allison L. Weathers, MD	Cleveland Clinic, OH	Interpreted the data; drafted and revised the manuscript for intellectual content
David A. Evans, MBA	Texas Neurology, Dallas	Interpreted the data; drafted and revised the manuscript for intellectual content
Rebecca A. Wolf, MBA	American Academy of Neurology, Minneapolis, MN	Major role in acquisition of data; revised the manuscript for intellectual content
John P. Ney, MD, MPH	Edith Nourse Rogers VA Medical Center, Bedford, MA	Designed and conceptualized the study; analyzed the data; drafted and revised the manuscript for intellectual content

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