SPECIAL ARTICLE

DIFFERENCES IN EARNINGS BETWEEN MALE AND FEMALE PHYSICIANS

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Abstract *Background.* Male physicians have long earned more than female physicians, even after differences in the number of hours worked, specialty, practice setting, and other characteristics are taken into account. Whether earnings patterns have changed recently is not known.

Methods. I examined data on earnings from the 1991 Survey of Young Physicians, a nationwide survey of physicians under 45 years of age with two to nine years of practice experience. The results were compared with data from the 1987 Survey of Young Physicians and with data on the earnings of physicians with 10 or more years of experience from the American Medical Association's 1991 Socioeconomic Monitoring System survey.

Results. In 1990, young male physicians earned 41 percent more per year than young female physicians (male:female earnings ratio, 1.41; 95 percent confidence interval, 1.34 to 1.49). Per hour, young men earned 14 percent more than young women (ratio, 1.14; 95 percent confidence interval, 1.09 to 1.20). However, after adjustment for differences in specialty, practice setting, and other characteristics, no earnings difference was evident (ratio, 1.00; 95 percent confidence interval, 0.96 to 1.04). In general practice and family practice, women earned more than men, after adjustment for differences in other characteristics (ratio, 0.87; 95 percent confidence interval, 0.78 to 0.97). In internal-medicine subspecialties and emergency medicine, men earned more than women (ratio, 1.26; 95 percent confidence interval, 1.10 to 1.44). Among physicians with 10 or more years of experience, men also earned more than women (ratio, 1.17; 95 percent confidence interval, 1.07 to 1.27).

Conclusions. Young male and female physicians with similar characteristics earn equal amounts of money. However, differences in earnings between men and women remain among older physicians and in some specialties. (N Engl J Med 1996;334:960-4.)

A SUBSTANTIAL gap between the earnings of male and female physicians was identified in the mid-1970s.[1] Later studies confirmed that male physicians earned more than female physicians, even after adjustment for differences in the number of hours worked, specialty, practice setting, and other characteristics.[2-8] The most recent overall estimate indicated that in 1981 and 1982, men in medicine earned 13 percent more per hour than women, even after adjustment for differences in potentially confounding characteristics.[9] However, a number of changes in medicine and society suggest that the gap in earnings may have narrowed since the early 1980s. This study examined earnings in 1990 and compared them with earlier data, focusing on the incomes of young physicians (those under 45 years of age with two to nine years of practice experience) to determine whether there were any changes in the gap between the sexes.

METHODS

Data

The primary source of data for the study was the 1991 Survey of Young Physicians, sponsored by the Robert Wood Johnson Foundation and conducted by Mathematica Policy Research.[10] The survey was designed to question a representative sample of all allopathic physicians (and osteopathic physicians who completed residencies in allopathic medicine) who were under 45 years of age in 1991 and had been in practice for two to nine years. Half the 1991 survey sample was drawn from the pool of respondents to a similar survey conducted in 1987,[6] and half was a new random sample from the Physician Masterfile of the American Medical Association (AMA) with an intentional overrepresentation of physicians from minority racial and ethnic groups. The 1987 survey also randomly drew its potential respondents from the Physician Masterfile with an intentional overrepresentation of minority physicians. In all, 9745 physicians were selected for interview in the 1991 survey. Of these, 11 percent could not be located or were found to be ineligible for the survey. Interviews were completed with 6053 (70 percent) of the remaining physicians. In the current study, weighting to adjust for the complex sampling design and for nonresponse was used so that the results would be representative of all young physicians. Further information about the 1991 survey, including sampling procedures, weighting, and pretesting, has been published elsewhere.[10]

Physicians who were not practicing, reported working more than 126 hours per week, earned less than $10 per hour, had moved to another practice in 1990, or failed to report information needed for this analysis were excluded from the study. In addition, 45 women and 19 men who reported working less than 20 hours per week or less than 26 weeks per year were excluded, because data on earnings for physicians who reported low levels of work appeared to be unreliable and because earnings patterns for part-time and full-time workers may differ. My analysis is based on data from 4568 physicians (3425 men and 1143 women).

The 1991 survey asked physicians to report their income from medical practice in 1990, including "all income from fees, salaries, retainers, bonuses, and other forms of compensation," after expenses but before taxes. Contributions to pension, profit-sharing, or other deferred-compensation plans were excluded. To ascertain hourly earnings, yearly earnings were divided by the product of the number of weeks worked in 1990 and the number of hours worked per week. For this calculation, the number of hours worked per week was the number of hours the respondents reported working in the last full workweek before completing the survey.

The 1991 survey was compared with the 1987 Survey of Young Physicians to examine changes in earnings over time. The 1987 survey[6] asked 5865 physicians, under 40 years of age and with two to five years of practice experience, about their incomes and their practice patterns; the questions studied were identical to those on the 1991 Survey of Young Physicians. The response rate in the 1987 survey was 63 percent. Using the same criteria applied in the selection of the 1991 sample, I selected 3695 physicians (2918 men and 777 women) from the 1987 group for analysis. These physicians could thus be compared with physicians with the same level of experience in the 1991 survey. In addition, because 1605 physicians (1272 men and 333 women) were respondents to both the 1987 and 1991 surveys, their earnings could be examined longitudinally.

Data on the earnings of physicians with 10 or more years of practice experience were drawn from the 1991 AMA Socioeconomic Monitoring System Core Sample Survey.[11] In that survey, data on income and patterns of practice were collected for a representative sample of

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Table 1. Male:Female Earnings Ratios for Young Physicians in 1990.*

Income Category	Male:Female Ratio (95% CI)	P Value
Yearly income	1.41 (1.34–1.49)	<0.001
Hourly income		
Unadjusted	1.14 (1.09–1.20)	<0.001
Adjusted for specialty and setting	1.02 (0.98–1.06)	0.17
Adjusted for all variables†	1.00 (0.96–1.04)	0.96

*Data are from the 1991 Survey of Young Physicians.[10] The sample includes 3425 men and 1143 women. The P values shown are from t-tests. CI denotes confidence interval.

†Adjusted for specialty, practice setting, educational variables, experience, personal characteristics, characteristics of the community, AMA membership, specialty-board status, number of practices, and experience with malpractice claims.

4057 physicians in the AMA Physician Masterfile. The response rate was 67 percent. From these respondents, 1835 physicians (1690 men and 145 women) with 10 or more years of practice experience were selected with the same criteria used in selecting the 1991 sample of young physicians.

Statistical Analysis

Initially, ratios of the mean yearly earnings for men to the mean yearly earnings for women were computed with data from the 1991 Survey of Young Physicians. To adjust for differences in the number of hours worked, ratios of mean hourly earnings were examined. T-tests were used to evaluate the null hypothesis that the means were equal; 95 percent confidence intervals for the ratios were computed with bootstrap techniques.[12]

Hourly-earnings ratios were further adjusted for differences in selected characteristics of the physicians with weighted, multivariate regression analyses that modeled the natural logarithm of hourly earnings as a linear function of a set of independent variables. The key independent variable was a dummy variable with values of 1 for male physicians and 0 for female physicians. On the basis of previous studies of physicians' earnings,[1,3,9] control variables were also introduced into the analysis: the physician's specialty (13 fields of practice), practice setting (10 settings), medical education (type of medical school [public or private, U.S. or foreign], ranking of the school, graduate degrees acquired other than an M.D., and the taking of a leave of absence during medical school), experience (total years of practice experience and years in current main practice), personal characteristics (age, race or ethnic group, marital status, and parenthood status), selected characteristics of the community in which the physician practiced (urban or rural, income per capita, the percentage of the population over 65 years of age, the percentage of patients who were black or Hispanic, and the U.S. Census region), AMA membership, specialty-board status (certification or eligibility for certification), the number of concurrent practices, and whether the physician had ever been subject to a claim of malpractice.

Differences in specialty and practice setting were of particular interest; some analyses were adjusted only for these variables. Estimates of the adjusted ratios of men's hourly earnings to women's hourly earnings were computed on the basis of the regression analysis.[13] The regression method I used held coefficients to be the same for men and women; the results were verified with a second method that allowed the coefficients to vary.[14] Additional technical information describing the analyses is available elsewhere.*

The 1987 Survey of Young Physicians was used as a base line for assessing changes over time in the gap in earnings between the sexes. Two comparisons are presented here. First, earnings in the 1987 sample were compared with earnings in a comparable subgroup in the 1991 Survey of Young Physicians (1597 men and 614 women with two to five years of practice experience). Second, earnings in the years 1986 and 1990 were compared for a sample of physicians who were interviewed in both 1987 and 1991. Ratios of men's earnings to women's earnings were computed as described above. The regression analyses used to compute the 1986 and 1990 adjusted ratios of hourly earnings controlled for identical sets of characteristics. F tests were used to assess the null hypothesis that the 1986 and 1990 ratios were equal.

Data on physicians with 10 or more years of experience from the 1991 AMA Socioeconomic Monitoring System survey were examined, along with data from the 1991 Survey of Young Physicians, to evaluate differences in earnings according to levels of experience. The ratios of men's earnings to women's earnings in 1990 for physicians with different levels of experience were computed in a similar manner.

Earnings ratios for 1990 were also computed separately for physicians in eight specialty categories and seven practice-setting catego-

Table 2. Selected Characteristics of Young Physicians.*

Variable	Percentage of Physicians		Mean Yearly Income	
	men	women	men	women
			dollars	
All physicians	100	100	155,000	110,000
Specialty				
General or family practice†	15	15	101,000	81,000
General internal medicine	20	22	126,000‡	89,000
Pediatrics	7	18	111,000	86,000
Subspecialty internal medicine	5	2	169,000‡	98,000
Emergency medicine	6	3	146,000‡	106,000‡
General surgery	6	2	205,000‡	—§
Subspecialty surgery	12	4	220,000‡	153,000‡
Obstetrics and gynecology	5	10	221,000‡	180,000‡
Radiology	4	3	202,000‡	173,000‡
Anesthesiology	5	5	208,000‡	157,000‡
Pathology	2	2	132,000‡	117,000‡
Psychiatry	5	7	130,000‡	101,000‡
Other¶	8	8	157,000‡	119,000‡
Practice setting				
Solo practice, self-employed†	22	14	181,000	132,000
Group practice, self-employed	33	24	186,000	149,000‡
Group practice, employee	10	14	134,000‡	91,000‡
Health maintenance organization	3	7	115,000‡	102,000‡
Hospital	12	15	125,000‡	96,000‡
Free-standing care center	1	3	100,000‡	76,000‡
Medical school	7	7	129,000‡	101,000‡
University or college	3	5	125,000‡	92,000‡
Government	1	3	106,000‡	68,000‡
Other‖	7	9	87,000‡	76,000‡
Experience				
2–5 yr†	45	51	138,000	98,000
6–9 yr	56	49	169,000‡	123,000‡
Family status				
Not married, no children†	10	17	125,000	123,000
Married, no children	11	16	138,000	110,000
Married, with children	77	64	162,000‡	106,000‡
Not married, with children	2	3	147,000	127,000
AMA membership				
Yes†	39	27	175,000	128,000
No	61	73	143,000‡	103,000‡
Specialty-board status				
Board-certified†	87	87	157,000	111,000
Board-eligible	6	6	138,000	102,000
Not board-certified or -eligible	8	7	147,000	98,000
Malpractice status				
No malpractice claims†	78	85	146,000	102,000
≥1 Malpractice claim	22	15	190,000‡	155,000‡

*Data are from the 1991 Survey of Young Physicians.[10] Percentages may not total 100, because of rounding. Earnings are for 1990. The sample included 3425 men and 1143 women.

†Reference group.

‡$P<0.05$ for the comparison with the income of the reference group. Significance was tested separately for men and women by analysis of variance, with contrasts between subgroups.

§Mean income was not calculated because there were fewer than 20 physicians in this category.

¶Includes dermatology, neurology, aerospace medicine, general preventive medicine, physical medicine and rehabilitation, public health, occupational medicine, and radiation oncology.

‖Includes long-term care facilities, community health programs, and industrial, commercial, and for-profit clinics.

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Table 3. Male:Female Earnings Ratios for Young Physicians in 1986 and 1990.*

Group and Year	No. of Physicians		Male:Female Earnings Ratio (95% Confidence Interval)		
	Men	Women	Yearly Earnings	Unadjusted Hourly Earnings	Adjusted Hourly Earnings†
Physicians with 2 to 5 years of experience					
1986	2918	777	1.46 (1.39–1.53)	1.25 (1.19–1.31)	1.07 (1.03–1.11)
1990	1597	614	1.42 (1.33–1.51)	1.09 (1.02–1.17)	0.97 (0.92–1.02)
Physicians surveyed for both 1986 and 1990					
1986	1272	333	1.41 (1.32–1.51)	1.22 (1.12–1.31)	1.06 (0.99–1.12)
1990	1272	333	1.43 (1.29–1.57)	1.21 (1.10–1.31)	1.07 (1.00–1.14)

*Data on 1986 earnings are from the 1987 Survey of Young Physicians.[6] Data on 1990 earnings are from the 1991 Survey of Young Physicians.[10]

†Adjusted for specialty, practice setting, educational variables, experience, personal characteristics, characteristics of the community, AMA membership, specialty-board status, number of practices, and experience with malpractice claims.

ries. Earnings ratios for each specialty and practice setting were computed in a similar manner.

Results

Earnings in 1990

In 1990, the mean earnings of young physicians were $155,400 for men and $109,900 for women; the male:female earnings ratio was thus 1.41 (95 percent confidence interval, 1.34 to 1.49) (Table 1). Part of the difference between men's and women's earnings is attributable to the number of hours and weeks worked. Men reported working an average of 62 hours per week for 47 weeks; women reported working 51 hours per week for 46 weeks. The mean hourly earnings of young male physicians were $56, and those of young female physicians were $49; men thus earned 14 percent more per hour than women (ratio, 1.14; 95 percent confidence interval, 1.09 to 1.20).

Differences in earnings may also be attributable to differences in specialty, practice setting, and other characteristics; some potentially related characteristics are shown in Table 2. In this sample, as among physicians in general, men were better represented than women in the more specialized fields and were more likely to be self-employed and thus in practices where earnings tend to be comparatively high. Adjustment for differences in specialty and practice setting reduced the male:female ratio for hourly earnings to 1.02 (95 percent confidence interval, 0.98 to 1.06). Adjusting for the full set of variables (specialty, practice setting, educational variables, experience, personal characteristics, characteristics of the community, AMA membership, specialty-board status, number of practices, and experience with malpractice claims) further reduced the ratio to 1.00 (95 percent confidence interval, 0.96 to 1.04).

Changes over Time

To assess changes in the male:female earnings ratio over time, I compared income data for the years 1986 and 1990 from the Surveys of Young Physicians conducted in 1987 and 1991. First, to examine changes in the earnings of physicians who were beginning practice, I calculated, with identical methods, male:female ratios for physicians with two to five years of experience in 1987 and for physicians with the same level of experience in 1991 (Table 3). The 1986 male:female ratio of hourly earnings for new physicians, adjusted for the full set of characteristics, was 1.07 (95 percent confidence interval, 1.03 to 1.11). However, no significant gap in adjusted hourly earnings was found four years later among physicians who had recently entered practice (ratio, 0.97; 95 percent confidence interval, 0.92 to 1.02). The 1990 ratio was significantly lower than the 1986 ratio ($P<0.001$).

Earnings ratios in 1986 and 1990 were also examined longitudinally in a sample of physicians who took part in both the 1987 and 1991 surveys. The adjusted ratio for hourly earnings in 1986 was 1.06 (95 percent confidence interval, 0.99 to 1.12). In 1990, the adjusted ratio in the same group of physicians was 1.07 (95 percent confidence interval, 1.00 to 1.14). The two ratios are not significantly different ($P=0.79$).

The Effects of Experience, Specialty, and Practice Settings

Both the unadjusted and adjusted ratios of men's to women's hourly earnings increased with experience (Table 4). After adjustment for the full set of characteristics, men with 10 or more years of experience earned 17 percent more per hour than their female colleagues (ratio, 1.17; 95 percent confidence interval, 1.07 to 1.27). Earnings were approximately equal among physicians with two to five years of experience (ratio, 0.98; 95 percent confidence interval, 0.93 to 1.04).

The gaps in earnings between the sexes also varied according to specialty (Table 5). After adjustment for differences in other characteristics, men in general practice and family practice earned 13 percent less than women (ratio, 0.87; 95 percent confidence interval, 0.78 to 0.97). In the internal-medicine subspecialties and emergency medicine, men earned 26 percent more than women (ratio, 1.26; 95 percent confidence interval, 1.10 to 1.44). Af-

Table 4. Male:Female Earnings Ratios in 1990, According to Level of Experience.*

Experience	No. of Physicians		Male:Female Earnings Ratio (95% Confidence Interval)		
	Men	Women	Yearly Earnings	Unadjusted Hourly Earnings	Adjusted Hourly Earnings†
2–5 yr	1597	614	1.42 (1.33–1.51)	1.09 (1.02–1.17)	0.98 (0.93–1.04)‡
6–9 yr	1828	529	1.38 (1.27–1.49)	1.16 (1.06–1.24)	1.04 (0.98–1.10)
≥10 yr	1690	145	1.58 (1.40–1.78)	1.46 (1.33–1.60)	1.17 (1.07–1.27)

*Data on physicians with two to five years and six to nine years of experience are from the 1991 Survey of Young Physicians.[10] Data on physicians with 10 or more years of experience are from the 1991 AMA Socioeconomic Monitoring System Core Sample Survey.[11]

†Adjusted for specialty, practice setting, educational variables, experience, personal characteristics, characteristics of the community, AMA membership, specialty-board status, number of practices, and experience with malpractice claims.

‡Differs slightly from the value given in Table 3 because of slight differences in the variables used in the adjustment.

Table 5. Male:Female Earnings Ratios in 1990 According to Specialty and Practice Setting.*

Variable	No. of Physicians		Male:Female Earnings Ratio (95% Confidence Interval)		
	Men	Women	Yearly Earnings	Unadjusted Hourly Earnings	Adjusted Hourly Earnings†
Specialty					
General and family practice	497	152	1.25 (1.11–1.39)	0.90 (0.79–1.02)	0.87 (0.78–0.97)
General internal medicine	567	233	1.42 (1.29–1.57)	1.13 (1.01–1.25)	1.06 (0.97–1.15)
Pediatrics	261	325	1.29 (1.16–1.44)	0.99 (0.88–1.10)	0.93 (0.83–1.04)
Subspecialty internal medicine or emergency medicine	360	56	1.54 (1.30–1.80)	1.41 (1.23–1.62)	1.26 (1.10–1.44)
Surgery	599	65	1.41 (1.22–1.64)	1.13 (0.94–1.34)	1.08 (0.92–1.27)
Obstetrics and gynecology	103	105	1.23 (1.03–1.45)	1.07 (0.90–1.28)	1.00 (0.82–1.20)
Radiology, anesthesiology, or pathology	441	118	1.25 (1.11–1.40)	1.08 (0.96–1.22)	1.00 (0.90–1.10)
Other‡	427	179	1.33 (1.11–1.53)	1.08 (0.93–1.23)	0.98 (0.89–1.08)
Practice setting					
Solo practice, self-employed	784	170	1.38 (1.18–1.60)	1.09 (0.95–1.25)	0.98 (0.88–1.10)
Group practice, self-employed	1096	249	1.25 (1.13–1.38)	1.11 (1.00–1.22)	1.05 (0.96–1.14)
Group practice, employee	341	155	1.47 (1.31–1.64)	1.10 (0.96–1.26)	1.01 (0.90–1.13)
Health maintenance organization	115	83	1.13 (0.94–1.34)	0.95 (0.79–1.13)	0.92 (0.79–1.06)
Hospital	429	165	1.31 (1.17–1.46)	1.07 (0.93–1.20)	0.97 (0.87–1.06)
Academic§	312	127	1.32 (1.16–1.50)	1.06 (0.92–1.21)	0.97 (0.86–1.07)
Other¶	348	194	1.23 (1.12–1.35)	1.01 (0.92–1.11)	1.07 (0.98–1.17)

*Data are from the 1991 Survey of Young Physicians.[10]

†Adjusted for educational variables, experience, personal characteristics, characteristics of the community, AMA membership, specialty-board status, number of practices, and experience with malpractice claims. Ratios according to specialty are also adjusted for practice setting; those according to practice setting are also adjusted for specialty.

‡Includes psychiatry, dermatology, neurology, aerospace medicine, general preventive medicine, physical medicine and rehabilitation, public health, occupational medicine, and radiation oncology.

§Includes medical schools, universities, and colleges.

¶Includes government, free-standing care centers, long-term care facilities, community health programs, and industrial, commercial, and for-profit clinics.

ter adjustment for the differences in other characteristics, there were no significant differences in the male: female earnings ratios according to practice setting.

Discussion

The difference in annual earnings between young male and young female physicians in 1990 can be fully attributed to differences in hours worked, specialty, practice setting, and other characteristics. Although earlier studies found that men earned more than women, even after adjustment for such differences,[1-3,9,15] I found no evidence that young male and young female physicians with the same characteristics earned different amounts in 1990. Furthermore, the earnings gap between men and women entering practice narrowed significantly, and in fact may have been eliminated, between 1986 and 1990.

There are several possible explanations for the narrowing gap between the sexes. If the earnings of female physicians had been kept artificially low by discrimination or other barriers, the increases in the number of women in medicine[16,17] might have helped to lower these barriers and raise earnings. Increases in the number of female physicians, as well as broader social trends, may also have prompted patients who once would not have consulted a female physician to wish to do so, thereby increasing the demand for female physicians. Large group practices, health maintenance organizations, and other provider organizations, on the rise in recent years, may promote equality of income among their staff and employees. Their demand for female physicians may also have increased because they want a more equitable balance of men and women on their staffs or want to attract more female patients.[18]

A further factor may be the public's continuing attention to issues of sexual equality and the role of women in the labor force, which may have helped to sensitize patients and providers and change their expectations. Finally, changes in medical education may have improved the ability of women to compete for earnings, and increases in women's income in other fields may have bolstered their earnings in medicine.

Although a decline in the earnings gap between the sexes is good news, continued attention to differences in physicians' earnings is warranted. Gaps remain in some specialties and among older physicians. Moreover, these gaps may prove persistent. In my study, the gap seen between men and women in the earnings of young physicians in 1986 had not changed significantly when these same physicians were resurveyed four years later.

Furthermore, my study did not address the process by which male and female physicians choose — and are chosen for — their specialties and practice settings. In fact, differences in specialty and practice setting account for the majority of the difference in hourly earnings between the sexes. The choices physicians make about specialization and the settings in which they will practice involve a variety of considerations; these include their preferred practice environments and each physician's sense of his or her social role and family responsibilities. Limitations in opportunity, real and perceived, may also be important. Several commentators have recently argued that discrimination continues to be an issue in the careers of female physicians,[19-21] and the results of this study should not be interpreted as evidence that discrimination is no longer a problem. Overall, however, these findings bode well for female physicians and for medicine in general.

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