Changes in the Hours Worked by Physicians, 1970–80

MARC P. FREIMAN, PHD, AND WILLIAM D. MARDER, AM

Abstract: The hours worked by physicians are affected by changes in a number of factors, including attitudes towards labor-leisure tradeoffs, the characteristics of the physician workforce, and the level of demand for medical services. This paper analyzes changes in the hours worked per week by office-based physicians over the decade 1970–80. Overall, there has been a statistically significant decline in hours of approximately 3 per cent, or 1.5 hours per week. This decline was fairly uniform across most physician characteristics, although the decline was greater for those in primary care specialties. Female physicians increased their average hours worked, although this increase was not statistically significant. In terms of the delivery of skilled medical services, the decline in total hours was largely offset by an increase in the percentage of total hours devoted to patient care. The question of whether these trends will continue has important implications for the validity of projections of a physician surplus in the near future. (*Am J Public Health* 1984; 74:1348–1352.)

Introduction

Physicians have traditionally worked long hours. Most physicians are self-employed, and self-employed workers generally work longer hours than wage and salary workers (41.9 versus 38.4 hours per week in 1979).[1] In 1979, physicians worked an average of 49.7 hours, almost eight hours more than other self-employed workers.[2]

In recent years, many factors have been at work that could decrease the average number of hours physicians choose to work. The proportion of female physicians has risen from 7.9 per cent in 1970 to 11.6 per cent in 1980,[3] and office-based female physicians in the past have worked fewer hours than male physicians. Some researchers expect that the aging of the labor force will result in earlier retirement and more part-time work on the part of older workers, and these effects may also apply to physicians.[4,5] Finally, many members of society are evaluating the relative importance of time spent at work and in family and leisure-time activities. Of particular importance to physicians are recent studies that indicate that for workers in general a high correlation exists between total hours worked and work-family conflicts.[6]

At the same time, changes are occurring in the health care market-place that will affect the number of hours of skilled medical care demanded from each physician. The population has grown older. On average, 11.3 per cent of the population was age 65 or older in 1980, up from 9.8 per cent in 1970.[7] The age and other characteristics of the patient population, and the government and private programs that provide them with coverage, will collectively determine the demand for health care services. The growing number of physicians, and the changes in the numbers of other health care personnel, will determine the average level of health care activity needed from physicians.

It is important to realize that changes in the hours worked by physicians and changes in the levels of health care provided by them are not necessarily the same. Not all of the time spent by physicians at work is spent in the delivery of patient care. Physicians can alter the proportion of their work time spent in the delivery of skilled medical services by changing their use of secretarial and administrative personnel, allied health personnel, automated bookkeeping systems, etc.

Other researchers have presented data on, or analyses of, hours worked by physicians for a single time period.[8–12] This paper analyzes the change in weekly hours worked by physicians over the decade 1970 to 1980, and the change in the proportion of this time spent in patient care. The goals of the analysis are to determine the extent of any overall change in either dimension, the degree to which such change differs for various groups of physicians, and the implications for future behavior.

Methods

Data

The data for 1970 are derived from the Sixth Periodic Survey of Physicians (PSP6), conducted by the American Medical Association (AMA) in 1970; data for 1980 are from the AMA's Fourteenth Periodic Survey of Physicians (PSP14), conducted in 1980. In both cases, the data are derived from a question that asked how many hours the physician practiced during the most recent complete week of practice. Both surveys covered office-based, patient-care physicians. Further details of the survey methodology are presented in Appendix A.

Analysis

A number of methods were used to analyze the data. At the most descriptive level, univariate comparisons of means were performed. A multivariate analysis was also carried out for male physicians of factors associated with changes in hours worked per week over the decade 1970 to 1980. This was accomplished by first grouping the observations into cells defined along four dimensions: age, location of practice, practice mode, and specialty type. For each cell, the change in the mean hours worked between 1970 and 1980 was calculated. A regression was then run, using each cell as an observation. The dependent variable was the change in weekly hours for the cells. The dimensions of the cells (e.g., age 35–45, primary care, urban, solo practice) were the independent variables. In essence, a four-way analysis of variance was performed. Each of the 55 observations (cells) was weighted by the standard error of its change in hours to correct for heteroscedasticity.

Finally, the overall change in average hours worked by physicians was decomposed into changes resulting from shifts in the proportions of physicians in specific subgroups, and changes due to movements in the hours worked by physicians within each subgroup. The decomposition uti-

Address reprint requests to William D. Marder, AM, Senior Economist, Center for Health Policy Research, American Medical Association, 535 North Dearborn Street, Chicago, IL 60610. Dr. Freiman is also an Economist at the AMA Center for Health Policy Research. This paper, submitted to the Journal December 12, 1983, was revised and accepted for publication May 15, 1984.

TABLE 1—Average Weekly Hours of Work, 1970 and 1980[a]

Characteristics	1970	1980	Difference (1970–1980)
All Physicians	51.9	50.4	−1.5*
Age (years)			
Under 35	52.8	53.3	+0.5
35–45	54.6	52.7	−1.9*
45–55	53.3	52.2	−1.1*
55–65	50.5	49.0	−1.5*
65–75	43.6	42.0	−1.6
Over 75	35.4	34.8	−0.6
Sex			
Male	52.5	50.8	−1.7*
Female	41.5	43.3	+1.8
Specialty Group			
Primary Care	52.9	50.7	−2.2*
Non-Primary Care	50.9	50.2	−0.7
GP-FP	52.7	49.0	−3.7*
Surgery	53.9	52.8	−1.1
Type of Practice			
Solo	51.5	49.1	−2.4*
Group	54.4	52.7	−1.7*
Other	47.6	46.8	−0.8
Location			
Urban	51.3	50.1	−1.2*
Non-Urban	54.9	52.4	−2.5*
Location of Medical School			
USMGs	52.2	50.6	−1.6*
FMGs	48.4	49.5	+1.1

SOURCE: AMA: Periodic Survey of Physicians PSP6 and PSP14 (see text).
*Significant difference at .05 level between 1970 and 1980 figures.
[a]Total number of cases: 4,252 in 1970 and 5,051 in 1980.

lized is exhaustive and non-overlapping. Appendix B presents the detailed methodology.

Results

As shown in Table 1, the number of hours worked per week by physicians declined from 51.9 in 1970 to 50.4 in 1980. Hours of work are greatest early in the career (under age 35 in 1980, ages 35–45 in 1970), and decline slightly to age 65, at which point they tail off more sharply. The differences among age categories are statistically significant. As opposed to the decline in hours worked by males, female physicians exhibit an increase in weekly hours.

The hours worked by primary care physicians declined by a greater amount than those for non-primary care physicians.* The decline in hours was greater for non-urban than for urban physicians,** non-urban physicians still work more hours than their urban counterparts.

One key area of change in medical practice over the past decade has been in practice structure. The percentage of respondents in group practice rose from 33.7 in 1970 to 41.6 in 1980. For physicians in solo and group practice, there has been a statistically significant decline in hours worked per week. For those in other types of practice, however, hours worked have remained approximately constant.***

United States medical school graduates (USMGs) experienced the same significant decline in hours that has been discussed above, but foreign medical graduates (FMGs) exhibited a slight (non-significant) increase in hours worked.

Further Analysis of the Determinants of Changes in Hours

A multivariate analysis was performed of factors associated with changes in hours worked per week over the decade 1970 to 1980. This regression analysis was carried out for male USMGs only.

The only coefficient that was statistically significant was the one for primary care. The absence of statistical significance for the other specific characteristics of physicians supports the impression given in Table 1 of a widespread and fairly uniform decline in weekly hours worked.

The significant coefficient for the primary care variable was negative, indicating that male physicians in these specialties decreased their hours worked by an even larger amount than other male physicians. The lack of significance for the solo or non-urban practice variables may indicate that disproportionate representation of primary care physicians in these categories was one reason for the greater decrease in hours worked by these groups as shown in Table 1.

Decomposition of the Overall Change in Hours Worked

Up to this point, we have been analyzing changes in hours worked for specific groups of physicians. However, changes in the overall number of hours worked by physicians can also result from changes in the proportions of physicians in different groups. This final aspect of the issue is analyzed by the decomposition of the overall change in the hours worked by physicians into two components: 1) the change in hours worked for specific subgroups of the physician population, and 2) the change in the proportion of physicians in each of these subgroups.

*Primary care physicians are those whose specialties fall in one of the following fields: general or family practice, internal medicine, pediatrics, or obstetrics/gynecology. Non-primary care specialties are: surgery, radiology, psychiatry, anesthesiology, and all other.

**Urban is defined here as residing in a county that is either part of a standard metropolitan statistical area (SMSA) or considered a potential SMSA.

***Physicians in these other types of practice accounted for only 8.6 per cent of the total in 1980 and 14.4 per cent in 1970. It is difficult to determine what these other types of practice are, but one group may be non-hospital-based employees of state and local governments.

TABLE 2—Decomposition of Overall Change in Hours Worked

	Total Impact of Each Group	Change Due to Δ in Proportion of Physicians in Group	Change Due to Δ in Hours Worked within Group
All Physicians	−1.48 hours	−0.29 hours	−1.19 hours
USMGs			
Male, Young, Primary Care	−0.41	−0.07	−0.34
Male, Young, Non-primary Care	−0.06	0.0	−0.06
Male, Old, Primary Care	−0.60	0.0	−0.60
Male, Older, Non-primary Care	−0.41	0.05	−0.46
Female	+0.13	0.05	0.08
FMGs	−0.13	−0.32	0.19

The results of this decomposition are presented in Table 2. The second column of Table 2 indicates that except for the effect of the increase in the proportion of FMGs, changes in the proportions of physicians in the various groups had little impact on the overall average hours worked by physicians. For USMG groups, the shares of the population changed very little between 1970 and 1980, which accounts for the small effects shown in column 2. The positive effect of female US graduates shown in this column is a result of a small decline in their proportion of this office-based group (in contrast to the larger proportion of female physicians in general).

The groups with the largest total impacts (column 1) on the overall average hours worked are male primary care physicians of all ages and older male physicians in non-primary care. The only group with a positive impact overall are female USMGs.

Patient Care versus Non-Patient Care Hours

Some percentage of a physician's time is taken up with activities such as bookkeeping, administration, and meetings. As the practice of medicine becomes increasingly sophisticated, changes may occur in the proportion of time that physicians devote to each segment of their work. Table 3 presents the proportion of total weekly work hours spent in patient care for selected groups of physicians.† From 1970 to 1980, the overall average percentage of hours spent in patient care increased from 87.7 per cent to 90.8 per cent, but the increase for females was negligible.

All of the specialty groups shown here experienced a statistically significant increase in this proportion. All of the remaining groupings shown in Table 3 also display increases that are statistically significant, with the one exception of FMGs.

The overall increase in this proportion tends to indicate that the practice of medicine has become more efficient over the period of study.

Discussion

Overall, from 1970 to 1980 the average number of hours worked per week by physicians followed the path shown by most other occupations—namely a small decrease. In particular, hours worked declined by 1 1/2 hours, or almost 3 per cent. Physicians still worked substantially more hours than self-employed workers in general, whose weekly hours declined by an even greater percentage.[13]

Although this decline may appear to be small, its magnitude should not be underestimated. PSP6 and PSP14 indicate that over this decade the number of weeks worked per year did not change. The 1 1/2 hour per week decline would therefore be equivalent in its impact to the effect of almost 8,000 non-federal office-based physicians leaving the labor force, assuming no change in the hours worked of those remaining. This represents a noteworthy change in the labor-leisure behavior of physicians over the period of study.

At the same time, physicians have increased the proportion of their total work time devoted to patient care. As a result, the movement toward more leisure time on the part of physicians has had a minimal impact on the quantity of skilled medical care provided.

These countervailing trends may have important implications for the future. Studies such as the oft-cited Graduate

TABLE 3—Per Cent of Total Weekly Work Hours Spent in Patient Care, 1970 and 1980

	1970	1980	Difference (1970–1980)
All Physicians	.877	.908	.031*
Sex			
Male	.877	.910	.033*
Female	.867	.873	.006
Specialty Group			
Primary Care	.900	.920	.020*
Non-primary Care	.851	.894	.043*
General/Family Practice	.913	.929	.016*
Surgery	.885	.903	.018*
Type of Practice			
Solo	.897	.919	.022*
Group	.887	.912	.025*
Other	.775	.814	.039*
Other Characteristics			
Urban	.873	.905	.032*
Rural	.898	.923	.025*
USMG	.876	.909	.033*
FMG	.879	.901	.022

SOURCE: AMA: Periodic Survey of Physicians PSP6 and PSP14 (see text).
*Significant difference at .05 level between 1970 and 1980 figures.

†The amount of time spent in patient care was computed from physician responses to a separate question on the number of hours spent in direct patient care. This response, coded and reconstructed in the same fashion as the total hours question, was divided by total hours to construct the percentage of time spent in patient care.

Medical Education National Advisory Committee (GMENAC) report have projected a physician surplus by the year 1990. In particular, the GMENAC report projects a surplus of 70,000 physicians.

A decline of only a few hours per week in the time spent by physicians in patient care would eliminate much of this surplus. It is therefore important to determine whether physicians will continue to decrease their total hours of work, and whether they will be able to further increase the efficiency of their practice.

It is noteworthy that forecasts such as those of GMENAC for the most part do not explicitly take into account these potential shifts in the flow of services generated by the stock of future physicians. Nor do projections of future costs of medical care, as calculated by such researchers as Sloan and Schwartz.[14]

As opposed to the decline in hours worked by males, female physicians worked slightly more hours per week. This increase is noteworthy, and may have been the result of a combination of factors. The general decline in the number of hours worked may have been counteracted by a stronger attachment to the workforce on the part of women that has been documented in other areas.[4] Nevertheless, female physicians in office-based practice still worked substantially fewer hours than their male counterparts. Therefore, if the proportion of office-based physicians who are female grows in the future, this growth will reinforce the trend toward fewer hours.

Although the percentage of patient-care physicians in office-based practice remained approximately constant over the period studied here, there is some expectation that the percentage in non-office-based practice is growing. According to data for 1982 from the AMA's Socioeconomic Monitoring System, these physicians worked approximately two fewer hours per week than office-based physicians. A trend away from office-based practice therefore will also contribute to a further decline in the hours worked by physicians.

REFERENCES

1. Fain TS: Self-employed Americans: their number has increased. Monthly Labor Rev 1980; 103:3–8.
2. Glandon GL, Shapiro RJ (eds): Profile of Medical Practice 1980. Chicago: American Medical Association, 1980.
3. Eiler MA: Physician Characteristics and Distribution in the US, 1982 edition. Chicago: American Medical Association, 1983.
4. Young AM: Work experience of the population in 1978. Monthly Labor Rev 1980; 103:43–47.
5. Morrison MH: The aging of the US population: human resource implications. Monthly Labor Rev 1983; 106:13–19.
6. Pleck JH, Staines GL, Lange L: Conflicts between work and family life. Monthly Labor Rev 1980; 103:29–31.
7. US Department of Commerce, Bureau of the Census: Statistical Abstract of the United States 1982–83. Washington, DC: Govt Printing Office, 1982; 25.
8. Bobula JD: Work patterns, practice characteristics, and incomes of male and female physicians. J Med Educ 1980; 55:826–833.
9. Mechanic D: The organization of medical practice and practice orientations among physicians in prepaid and nonprepaid primary care settings. Med Care 1975; 13:189–204.
10. Langwell K, Werner J: Economic incentives in health manpower policy. Med Care 1980; 18:1085–1095.
11. Sloan FA: Physician supply behavior in the short-run. Industrial Labor Rel Rev 1975; 28:549–569.
12. Vahovich SG: Physician supply decision by specialty: 2SLS Model. Industrial Rel 1977; 16:51–69.
13. Hedges JN, Taylor D: Recent trends in work time: hours edge downward. Monthly Labor Rev 1980; 103:3–11.
14. Sloan FA, Schwartz WB: More doctors: what will they cost? JAMA 1983; 249:766–769.

ACKNOWLEDGMENTS

The views expressed here are those of the authors and do not necessarily represent those of the American Medical Association.

APPENDIX A

Data Sources

The American Medical Association's Periodic Survey of Physicians (PSP), begun in 1966 and ended in 1981, was designed to collect data that would be representative of the non-federal office-based physician population of the United States. PSP6 collected information on hours worked per week by physicians in 1970 from a random sample of 7,080 physicians. The sample was drawn from the AMA's Physician Masterfile, a census of the physician population of the United States, regardless of AMA membership. A series of follow-up mailings, at approximately monthly intervals during winter 1970 and spring 1971, resulted in a usable response rate of 71.7 per cent (4,452 responses). For the "total hours practiced" question specifically, there were 4,252 responses. PSP14 provided the data for 1980. The PSP14 questionnaire was mailed to 11,494 physicians. After four follow-up mailings during the spring and summer of 1980, a usable response rate of 50 per cent was obtained (5,133 responses). There were 5,051 responses to the specific question on total hours worked.

The hours-of-work questions were central to the PSP program, and consequently were included in each survey. However, there were some differences in the specific wording in different surveys. We therefore briefly examine the questions used in PSP6 and PSP14.

In PSP6, the hours of work question read: "How many hours did you practice during the most recent (or current) *complete week* of practice?"

☐ 0 ☐35–39 ☐ 55–59
☐ 1–14 ☐ 40–44 ☐ 60–64
☐ 15–29 ☐ 45–49 ☐ 65–69
☐ 30–34 ☐ 50–54 ☐ 70 hours or more

In PSP14, the question asked was worded as follows: "How many TOTAL HOURS did you practice during your most recent COMPLETE WEEK of practice? (EXCLUDE on-call hours not actually worked.) _____ HOURS"
Both questions explicitly ask for hours worked during a *complete* week of practice. In both surveys, respondents who indicated that they worked zero hours were excluded from the analysis.

The change in questionnaire wording from categorical to continuous (or open-ended) is not likely to affect the results presented here. As part of an experiment in survey methodology conducted with PSP13 in 1979, the AMA's Center for Health Services Research and Development sent questionnaires containing categorical questions to one group of respondents and similarly worded open-ended questionnaires to a control group. Neither the item response rates nor the estimated means computed for each sub-sample were significantly different. Thus, there is clear evidence from the population surveyed and for the specific question analyzed that means computed from either categorical or open-ended questions are likely to be the same. Furthermore, on PSP14, 86 per cent of the respondents with non-zero hours worked between 30 and 69 hours, where the categories on PSP6 are particularly detailed.

Because the focus of the present analysis is changes in the hours worked by physicians, it is important to make the figures for the two surveys as comparable as possible. The

results from PSP14 were therefore placed into the same categories as those for PSP6. In both cases the middle value of the category was then used. The large number of categories retains substantial detail from PSP14, and allows for rigorous comparisons of changes across the two surveys.†† For the open ended category (70 hours or more), the value used for both PSP6 and PSP14 was the mean value for this category as calculated for PSP14 (78 hours).

The parenthetical prompt on PSP14 to exclude "on call" hours not actually worked also appears to have had no significant effect on responses. This is the conclusion that results from comparing PSP6 with PSP8, conducted in 1973, which was the earliest survey that included this prompt. A comparison of the overall average hours worked as reported in PSP6 with the overall average for PSP8 yields no statistically significant difference. This outcome would contradict a claim that the addition of the prompt concerning on-call hours had been responsible for a significant portion of the reported decrease in hours. Furthermore, a comparison of the overall average hours worked between PSP8 and PSP14 does yield a statistically significant difference. That is, over a seven-year period where the wording of the question remained exactly the same, a significant overall decrease was found.

The exclusion of federal government employees and hospital-based physicians does not present a serious problem, or harm the usefulness of the results presented here. Federal government employees amounted to less than 5 per cent of all physicians in 1980, and have not shown any signs of increasing at a substantial rate. The proportion of hospital-based physicians also remained approximately constant over the past decade, at around 10 per cent. The discussion section of this paper contains further comments on this physician group.

Finally, the issue of seasonal variation in hours worked by physicians may raise questions about the generalizability of our results. The processing of a mail survey such as the PSP provides some information on these seasonal variations. PSP survey efforts lasted for almost five months (follow-up mailings at monthly intervals). In the 1981 survey, the date the questionnaire was returned was coded, thus early respondents (those who responded in April) can be compared to late respondents (those who responded in June or July). For the hours worked questions, there was no difference in the average hours worked in April compared to July. Although not conclusive, this evidence suggests that seasonal variations in hours worked in the "most recent complete week" of practice is not a problem for this study.

††The mean hours worked for PSP14, as calculated from the intervalized data, was almost identical to the mean calculated from the continuous data.

APPENDIX B

Decomposition of the Overall Change in Hours Worked, 1970–80

Let $H^1_{70} \ldots H^N_{70}$ be the mean hours worked for N subgroups of physicians in 1970, and $H^1_{80} \ldots H^N_{80}$ be the means for the same groups in 1980.

Define $H^i_{70} = \overline{H}_{70} + h^i_{70}$ where

$\overline{H}_{70}$ = overall 1970 mean for all physicians

h^i_{70} = difference between subgroup i mean and population mean. Also define $H^i_{80} = H^i_{70} + \Delta^i = \overline{H}_{70} + h^i_{70} + \Delta^i$, where Δ^i = change in mean hours worked for subgroup i from 1970 to 1980.

In each year the overall mean can be defined as a weighted average of the subgroup means

$$\overline{H}_{70} = a_1 H^1_{70} + \ldots + a_N H^N_{70}$$
$$\overline{H}_{80} = b_1 H^1_{80} + \ldots + b_N H^N_{80}$$

where a_i and b_i are the proportions of all physicians in subgroup i for 1970 and 1980 respectively.

Substituting, we get

$$\overline{H}_{70} = a_1 [\overline{H}_{70} + h^1_{70}] + \ldots + a_N [\overline{H}_{70} + h^N_{70}]$$
$$\overline{H}_{80} = b_1 [\overline{H}_{70} + h^1_{70} + \Delta^1] + \ldots + b_N [\overline{H}_{70} + h^N_{70} + \Delta^N]$$

Taking the difference yields

$$\overline{H}_{80} - \overline{H}_{70} = b_1 [\overline{H}_{70} + h^1_{70} + \Delta^1] + \ldots + b_N [\overline{H}_{70} + h^N_{70} + \Delta^N] + a_1 [\overline{H}_{70} + h^1_{70}] + \ldots + a_N [\overline{H}_{70} + h^N_{70}]$$
$$= b_1 \Delta^1 + \ldots + b_N \Delta^N + (b_1 - a_1) h^1_{70} + \ldots + (b_N - a_N) h^N_{70} + (b_1 + \ldots + b_N) \overline{H}_{70} - (a_1 + \ldots + a_N) \overline{H}_{70}$$

Because $(b_1 + \ldots + b_N)$ and $(a_1 + \ldots + a_N)$ each sum to one, the last two terms cancel out. We are left with two types of terms: $b_i \Delta^i$, which indicates the impact of the change in mean hours for subgroup i weighted by the proportion of the population in subgroup i, and $(b_i - a_i) h^i_{70}$, which indicates the impact of the change in the proportion in subgroup i, weighted by the difference in 1970 between the mean for that subgroup and the overall mean.

Macroeconomic Considerations in Health Care, 1922

"It is generally admitted by economists that the illness or premature death of any citizen represents a loss to the community, which is variously estimated in dollars; and it is hardly disputed that this loss frequently exceeds the cost of prevention—many times exceeds it. Because it is so easy to show that in terms of money the results of public health work greatly exceed the cost, it is customary to direct the appeal for support of such work most prominently to this motive of economic advantage. It is doubtful, however, that either the motive or the appeal is so powerful as is commonly supposed, because the citizens of a community desire economic advantage for themselves individually rather than for the community as such; and while it is easy to demonstrate the loss which preventable disease entails to a community, it is difficult to bring this loss home to the individual citizen whose affairs are prospering."

In: Frost WH: The development and scope of organized public health endeavor. Michigan Public Health 1922; 10:436–441. (Submitted by Lawrence D. Budnick, MD, MPH, Philadelphia, PA.)