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# Internal Medicine Work Hours: Trends, Associations, and Implications for the Future

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There is increasing agreement that a US physician shortage looms in the near future.<sup>1-4</sup> In addition to the number of providers, a major determinant of clinical service capacity is the number of hours physicians work.<sup>5</sup> Two trends are receiving increased attention for their potential to decrease physician work hours in the future: the growing proportion of female providers, who generally work fewer hours than their male colleagues,<sup>6,7</sup> and increased concern for personal-professional time balance, which may result in future generations of physicians working fewer hours than their predecessors.<sup>6,8</sup>

This study examines the work hours of internal medicine physicians surveyed by the Community Tracking Study (CTS) Physician Survey in 1996-1997, 1998-1999, and 2000-2001. Unlike existing studies examining physicians of all specialties combined<sup>7</sup> or physicians subcategorized broadly across specialties into "generalists versus non-generalists,"<sup>1</sup> this study analyzes trends within the specialty of internal medicine, including both general internists and subspecialists. Prior single-specialty studies have examined fields such as pediatrics and dermatology.<sup>9,10</sup> This study focuses on internal medicine because of the central role its

practitioners will play in the care of the nation's rapidly increasing population of adults with chronic disease. The study examines how work hours vary by gender and age cohort to explore the potential impact of evolving gender ratios and changing attitudes toward work on future clinical capacity. The objective was to provide an analysis of trends and associations in work hours to inform decisions about the number of internal medicine physicians needed in the future.

## MATERIALS AND METHODS

The CTS Physician Survey is a national telephone survey of physicians and is conducted by the Center for Studying Health System Change. Detailed descriptions of this survey and its methodology are available online.<sup>11-13</sup> Briefly, participants are drawn from the American Medical Association and American Osteopathic Association master files and are required to provide at least 20 hours of direct patient care per week in the continental United States. Federal employees and physicians-in-training are excluded. Although response rates for the internal medicine subpopulation were not available, the rate for all physicians was 59% in 2000-2001,<sup>13</sup> 61% in 1998-1999,<sup>12</sup> and 65% in 1996-1997.<sup>11</sup>

General internal medicine (GIM) physicians were those respondents noting "internal medicine" as their primary specialty. Internal medicine subspecialists (IMSS) were identified by the 17 primary care subspecialties of internal medicine, as recognized by the American Medical Association.<sup>14</sup> A total of 3648 internal medicine physicians were identified from the

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2000-2001 survey; 3609 from the 1998-1999 survey; and 3633 from the 1996-1997 survey (Table 1).

The 2 work hours measures used in this study were “hours in all medically related activities” and “hours in patient care.” For hours spent in all medically related activities, physicians were to consider all of their practice locations and were asked: “During your last complete week of work, approximately how many hours did you spend in all medically related activities? Please include all time spent in administrative tasks, professional activities, and direct patient care. Exclude time on call when not actually working.”<sup>11-13</sup>

Hours spent in patient care were determined by a follow-up question: “Of these [reported] hours, how many did you spend in direct patient care activities?”<sup>11-13</sup> Participants in the 2000-2001 survey were further instructed that “Direct care of patients includes face-to-face contact with patients as well as patient record keeping and office work, travel time connected with seeing patients, and communication with other physicians, hospitals, pharmacies, and other places on a patient’s behalf.”<sup>13</sup> The authors assigned respondents a “work hours status” based on their hours in all medically related activities: “part-time” (<40 hours in the last complete week), “full-time” (40 to <60 hours), or “overtime” ( $\geq 60$  hours) (Table 2). The respondents also were classified into 1 of 3 age cohorts: “early career” physicians (<45 years of age at the time of survey administration), “mid-career” physicians (45 to <55 years of age), or “late-career” physicians ( $\geq 55$  years of age).

Participants in the 2000-2001 survey also were asked to rate the importance they assigned to “potential income” and “control over working hours” on a scale from 1 (not important) to 10 (very important). These variables served as proxies for the importance accorded personal-professional time balance under the assumption that physicians who value personal time more would rate “potential income” as less important and “control over work hours” as more important. Because the responses to these variables were both skewed toward “very important,” they were dichotomized at their mean values for regression analysis (Table 1).

All analyses were performed using SUDAAN 9.0.1 statistical software in conjunction with SAS 9.1 statistical software.<sup>15,16</sup> Means and proportions were weighted and adjusted to reflect CTS’s complex survey design. *P* values were obtained using *t* test and chi-square statistics. Linear and logistic regression models were used to evaluate the significance of differences in mean variable values across the 3 survey waves. Multi-

nomial logistic regression was used to estimate odds ratios for the relationship of work hours status (part-time, full-time, or overtime) and the following independent variables: age cohort, specialty (GIM or IMSS), importance accorded control over work hours, and importance accorded potential income.

The multinomial logistic regressions were stratified by gender, because preliminary analyses revealed gender to be statistically significant both as an independent variable and as part of an interaction term with age cohort.

This study was approved by the institutional review board of the University of California, Los Angeles, as well as the Inter-University Consortium for Political and Social Research, the organization that oversees access to and use of CTS data.

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## PERSPECTIVES VIEWPOINTS

- Analysis of internal medicine physician work hour trends.
- Discussion of how work hours can affect the future physician workforce.
- Factors include gender proportion, type of hours worked (patient care vs other medical activities), and number of hours worked (part-time, full time, overtime).

## RESULTS

Between 1996 and 2001, the mean hours reported in patient care by respondents increased from 47.0 to 49.0 ( $P < .0001$ ). Mean hours increased despite the fact that hours for all medically related activities decreased from 58.2 to 57.2 ( $P = .04$ ) during the same period. Male physicians reported an increase of patient care hours from 48.2 to 50.2 hours ( $P < .0001$ ), whereas female physicians reported an increase of mean patient care hours from 40.4 to 44.4 hours ( $P = .0001$ ). Decreases in hours spent in all medically related activities were not statistically significant in gender-stratified analyses (59.4 to 59.0 hours for the men,  $P = .45$ ; 51.8 to 50.2 hours for the women,  $P = .18$ ) (Table 3).

The mean work hours of male physicians consistently exceeded those reported by female physicians, whether GIM or IMSS, in patient care and in all medically related activities. In all but 1 comparison, these differences were statistically significant (Table 3). The average combined difference between genders over the 3 survey rounds for GIM and IMSS physicians was 6.9 hours per week for patient care and 8.3 hours per week for all medically related activities. However, differences between specific subgroups of men and women ranged from as few as 2.3 hours (IMSS patient care hours, 2000-2001) to as many as 9.9 hours per week (GIM hours in all medically related activities, 2000-2001).

Consistent trends did not emerge from tracking the work hours of early, mid-, and late-career physicians across the 3 survey rounds. For instance,

**Table 1** Internal Medicine Physician Characteristics: 1996-1997, 1998-1999, and 2000-2001\*

	Men	Women	Overall	P Value†
Survey respondents/weighted count				
1996-1997	2982/74,888	651/14,208	3633/89,095	
1998-1999	2827/77,706	782/18,588	3609/96,293	
2000-2001	2773/84,686	875/22,606	3648/107,292	
Age in years, mean (SE)‡				
1996-1997	48.3 (0.2)	43.8 (0.4)	47.6 (0.2)	<.001
1998-1999	48.0 (0.2)	44.2 (0.4)	47.2 (0.2)	<.001
2000-2001	47.8 (0.3)	44.1 (0.4)	47.1 (0.2)	<.001
Specialty, percentage general internal medicine (SE)				
1996-1997	48.2% (1.0)	57.7% (2.3)	49.7% (0.9)	<.001
1998-1999	47.7% (1.4)	64.5% (2.4)	51.0% (1.2)	<.001
2000-2001	52.3% (1.4)	66.5% (2.4)	55.4% (1.3)	<.001
Weeks per year practicing medicine, mean (SE)				
1996-1997	47.6 (0.1)	45.6 (0.4)	47.2 (0.1)	<.001
1998-1999	47.5 (0.1)	45.8 (0.3)	47.1 (0.1)	<.001
2000-2001	47.6 (0.1)	45.6 (0.3)	47.1 (0.1)	<.001
Satisfaction with overall career in medicine, mean (SE)§				
1996-1997	4.00 (0.05)	3.99 (0.04)	4.00 (0.04)	.809
1998-1999	3.91 (0.04)	3.85 (0.07)	3.90 (0.04)	.282
2000-2001	3.96 (0.03)	3.94 (0.05)	3.96 (0.03)	.764
Annual income from practice of medicine in thousands of dollars, mean (SE)				
1996-1997	178.9 (2.4)	120.6 (3.7)	169.6 (2.0)	<.001
1998-1999	182.3 (2.3)	120.3 (4.0)	170.3 (2.1)	<.001
2000-2001	192.6 (2.3)	119.5 (2.8)	176.4 (2.1)	<.001
Importance of control over work hours, mean (SE)				
2000-2001	8.77 (0.04)	9.06 (0.06)	8.83 (0.03)	<.001
Importance of potential income, mean (SE)				
2000-2001	8.14 (0.04)	7.89 (0.08)	8.09 (0.04)	.004

SE = standard error.

\*All presented means, proportions, and standard errors are based on weighted data.

†Comparing men versus women.

‡Calculated by subtracting birth year from the later survey year (ie, 1997 for 1996-1997, 1999 for 1998-1999).

§Rated on a scale of 1 (very dissatisfied) to 5 (very satisfied).

||Rated on a scale of 1 (not important) to 10 (very important); surveyed only in 2000-2001.

although hours spent in all medically related activities decreased between 1996-1997 and 2000-2001 for early and mid-career men and women, they actually peaked for mid-career men and were lowest for mid-career women in the 1998-1999 survey. Nevertheless, there were instances in which a subgroup's mean work hours changed in a consistent direction across all 3 survey rounds. When present, these trends were increasing for hours devoted to patient care and decreasing for hours devoted to all medically related activities (Table 4).

Examination of trends in work hours status across the 3 survey rounds revealed a small decrease in the proportion of men reporting part-time work hours (6% to 5%;  $P = .03$ ). Women showed a consistent but statistically nonsignificant trend toward increased part-time participation (20% to 22% to 24%;  $P = .20$ ) (Table 2).

The multinomial logistic regression model analyzing male physicians revealed that, in comparison with their early-career counterparts, late-career male physicians had 3.5 times the odds of working part-time hours and only about half the odds of working overtime hours when compared with full-time hours. Male subspecialists were significantly more likely to work overtime hours than their generalist counterparts. There were no statistically significant relationships between work hours status and the importance accorded control over work hours. However, contrary to expectations, males placing high value on potential income had slightly decreased odds of reporting overtime hours compared with full-time hours (Table 5).

The model analyzing female physicians revealed no significant differences between the work hours status of early and mid-career physicians, and a small sample-

**Table 2** Proportion of Internal Medicine Physicians Reporting Part-Time, Full-Time, or Overtime Hours for All Medically Related Activities, Stratified by Gender and Survey Round\*

	Men % (SE)	Women % (SE)	Overall % (SE)
1996-1997			
Part-time	6.2%† (0.5)	20.4%‡ (1.8)	8.5% (0.5)
Full time	36.7% (1.0)	44.8% (2.2)	38.0% (1.0)
Overtime	57.1% (1.1)	34.7% (2.6)	53.5% (1.1)
1998-1999			
Part-time	4.6%† (0.4)	21.7%‡ (2.0)	7.9% (0.5)
Full time	38.1% (1.1)	43.2% (2.4)	39.1% (0.9)
Overtime	57.3% (1.1)	35.1% (2.1)	53.0% (0.9)
2000-2001			
Part-time	4.6%† (0.6)	23.9%‡ (2.2)	8.6% (0.7)
Full time	40.4% (1.1)	44.0% (2.3)	41.2% (1.0)
Overtime	55.1% (1.2)	32.1% (2.0)	50.2% (1.1)

SE = standard error.

\*Proportions might not add up exactly to 100% because of rounding.

† $P = .03$  for the trend in part-time participation by men over the 3 survey rounds.‡ $P = .20$  for the trend in part-time participation by women over the 3 survey rounds.

size limited interpretation of the results for the late-career group. There were no significant relationships between work hours status and either specialty, or the importance accorded potential income. However, assigning high importance to control over work hours was associated with a significant decrease in the odds of working overtime compared with full-time hours.

## DISCUSSION

During the study period, internal medicine physicians as a group allocated more hours to patient care, even as they spent fewer hours in all medically related work activities. Because patient care hours increased, a continuation of this trend would not likely adversely affect the future supply of clinical services.

Gender-related differences in mean work hours were widespread and large enough that increasing the internal medicine workforce may be necessary to maintain service capacity in the future as the number of female practitioners increases. This particularly seems to be the case in GIM, where females disproportionately increased their presence during the study period and the gender-associated differentials in work hours were notably great. For instance, although the proportion of total female internal medicine physicians increased from 16% to 21% over 3 survey rounds and represented an increase from 19% to 25% ( $P < .0001$ ) among gen-

**Table 3** Hours Spent in Patient Care and All Medically Related Activities by Gender, Specialty, and Survey Round\*

	Men		Women		Overall	
	Patient Care Mean (SE)	All Medically Related Activities Mean (SE)	Patient Care Mean (SE)	All Medically Related Activities Mean (SE)	Patient Care Mean (SE)	All Medically Related Activities Mean (SE)
1996-1997						
GIM	46.9 (0.39)	57.9 (0.36)	38.8 (0.59)	49.7 (0.72)	45.4 (0.34)	56.4 (0.34)
IMSS	49.4 (0.52)	60.7 (0.52)	42.5 (1.51)	54.6 (1.54)	48.5 (0.50)	59.9 (0.48)
GIM and IMSS	48.2 (0.35)	59.4 (0.34)	40.4 (0.71)	51.8 (0.87)	47.0 (0.31)	58.2 (0.32)
1998-1999						
GIM	47.3 (0.41)	57.7 (0.39)	40.0 (0.63)	49.3 (0.74)	45.5 (0.37)	55.7 (0.33)
IMSS	50.5 (0.53)	61.5 (0.59)	45.0 (1.94)	55.1 (1.96)	49.7 (0.52)	60.6 (0.53)
GIM and IMSS	49.0 (0.36)	59.7 (0.38)	41.8 (0.77)	51.3 (0.78)	47.6 (0.33)	58.1 (0.33)
2000-2001						
GIM	49.6 (0.42)	58.1 (0.44)	42.4 (0.84)	48.2 (0.83)	47.8 (0.39)	55.5 (0.40)
IMSS	50.8† (0.52)	60.1 (0.55)	48.5† (1.85)	54.1 (2.03)	50.4 (0.53)	59.1 (0.59)
GIM and IMSS	50.2 (0.34)	59.0 (0.35)	44.4 (0.81)	50.2 (0.86)	49.0 (0.33)	57.2 (0.36)
Statistical significance‡	$P < .0001$	$P = .45$	$P = .0001$	$P = .18$	$P < .0001$	$P = .04$

GIM = general internal medicine; IMSS = internal medicine subspecialist.

\*All comparisons between men and women significantly different with at least  $P < .005$  for respective work categories and specialty groupings, except for patient care hours reported by men and women IMSS physicians in 2000-2001.†Comparison of patient care hours reported by male and female IMSS physicians in 2000-2001 was not statistically significantly different ( $P = .72$ ).

‡Comparing GIM and IMSS physicians combined for the indicated gender groups across the 3 survey rounds.

**Table 4** Hours in Patient Care and All Medically Related Activities by Age Cohort, Gender, and Survey Round

	Men		Women		Overall	
	Patient Care Mean (SE)	All Medically Related Activities Mean (SE)	Patient Care Mean (SE)	All Medically Related Activities Mean (SE)	Patient Care Mean (SE)	All Medically Related Activities Mean (SE)
<b>1996-1997</b>						
Early career	50.3 (0.51)	62.0 (0.50)	40.7 (0.85)	51.4 (1.04)	48.1 (0.45)	59.6 (0.49)
Mid-career	48.6 (0.54)	60.6 (0.52)	40.9 (1.32)	52.6 (1.39)	47.6 (0.51)	59.6 (0.51)
Late-career	44.1 (0.66)	53.1 (0.69)	37.4* (2.07)	51.9* (2.09)	43.5 (0.61)	53.0 (0.64)
<b>1998-1999</b>						
Early career	49.8 (0.60)	61.2 (0.61)	40.8 (0.86)	50.2 (0.91)	47.5 (0.54)	58.5 (0.53)
Mid-career	50.3 (0.84)	61.0 (0.81)	40.0 (1.66)	50.2 (1.82)	48.6 (0.87)	59.1 (0.85)
Late-career	45.2 (0.65)	54.9 (0.66)	51.7* (3.78)	60.0* (2.83)	45.9 (0.78)	55.4 (0.71)
<b>2000-2001</b>						
Early career	51.6 (0.53)	60.8 (0.48)	43.0 (1.20)	48.9 (1.32)	49.3 (0.54)	57.5 (0.57)
Mid-career	50.7 (0.54)	59.7 (0.58)	45.9 (1.44)	51.2 (1.49)	49.9 (0.52)	58.2 (0.56)
Late-career	46.4 (0.79)	54.4 (0.80)	47.2* (2.78)	53.4* (2.51)	46.5 (0.79)	54.2 (0.79)

SE = standard error.

\*Estimate based on &lt;100 respondents, which may result in statistically unstable results.

eral internists, this represented only a 13% to 16% ( $P = .12$ ) increase among IMSS physicians (data not shown). In each of the 3 survey rounds, male GIM physicians reported approximately 7.5 more hours in patient care per week than their female counterparts.

There was no clear evidence that physicians were working fewer hours than their predecessors at the same career stage. However, these findings should be considered preliminary because only a 5-year period was exam-

ined, a simplified age categorization was used, and only a small number of "leading edge" "Generation X" and subsequent physicians were included in the surveys.

Unexpectedly, but not entirely surprising, according great importance to control over one's work hours was not related to actual work hours status for men and was associated only with decreased odds of working overtime among women. Moving from "desire" to "reality" in the realm of work hours may remain an elusive goal in med-

**Table 5** Odds Ratios for the Relationship Between Work Hours Status and Age Cohort, Specialty, Importance of Control Over Work Hours, and Importance of Control Over Potential Income, 2000-2001\*

Respondents Included in Analysis/Weighted Count	Men		Women	
	Part-time OR (95% CI)	Over-time OR (95% CI)	Part-time OR (95% CI)	Over-time OR (95% CI)
Age cohort				
Early career	Reference category	Reference category	Reference category	Reference category
Mid-career	1.33 (0.78-2.27)	0.95 (0.74-1.21)	0.77 (0.40-1.49)	0.96 (0.59-1.55)
Late-career	<b>3.48 (1.94-6.25)</b>	<b>0.54 (0.41-0.70)</b>	0.47† (0.20-1.13)	0.93† (0.49-1.75)
Specialty				
GIM	Reference category	Reference category	Reference category	Reference category
IMSS	0.70 (0.44-1.12)	<b>1.31 (1.04-1.64)</b>	0.88 (0.41-1.88)	1.33 (0.85-2.10)
Importance of control over work hours (dichotomized)	1.14 (0.72-1.80)	1.03 (0.81-1.30)	0.88 (0.45-1.74)	<b>0.47 (0.30-0.75)</b>
Importance of potential income (dichotomized)	0.58 (0.33-1.04)	<b>0.80 (0.65-0.98)</b>	0.77 (0.45-1.31)	1.15 (0.77-1.72)
		Model Wald F = 53.4; $P < .0001$	Model Wald F = 4.1; $P < .0001$	

GIM = general internal medicine; IMSS = internal medicine subspecialist; CI = confidence interval; OR = odds ratio.

\***BOLD** results have  $P < .05$  and are not known to be statistically unstable because of small sample sizes.

†Estimates for late-career women are based on &lt;100 respondents in each survey round, which may result in statistically unstable results.

icine, or perhaps control over scheduling work hours rather than the quantity of hours matters most to physicians.

Although the overall CTS physician samples were designed to be nationally representative, the internal medicine subpopulations used in this analysis may not be similarly depictive. As previously mentioned, the 5-year study period was a brief one in which to capture trends believed to be gradual in nature. The exclusion of physicians with less than 20 hours of clinical work per week may have biased estimates for part-time participation downward. The more elaborate instructions used to ascertain patient care hours in the 2000-2001 survey also may represent a source of bias. Finally, it is difficult to assess the significance of results obtained for the late-career women because of the cohort's small sample size.

A central finding of this study is confirmation of a gender-related differential in work hours. In this regard, it should be noted that the authors were unable to address possible benefits of reduced hours, such as improved physician morale or quality of care for patients. Similarly, it was not possible to investigate potential problems, such as reduced continuity of care. This study also did not investigate the reasons why physicians of either gender work fewer hours, what activities their non-work hours might be directed toward, or what specific changes in practice administration and structure might support this evolving practice pattern.

There are many factors that might affect the eventual number of internal medicine physicians needed in the future. Although this study cannot provide the basis for specific projections, it highlights several important considerations. First, specialty-specific gender-stratified analyses can reveal important differences in physician work hours that are obscured in multispecialty models when the genders are analyzed together. Second, the content of work hours matters because providers can and do redistribute their time between patient care and other activities. Finally, it is important to consider whether trends, such as evolving gender proportions, might have concentrated effects on specific physician subgroups. Such is the case with work hours in GIM, where the rapidly growing proportion of women may decrease mean work hours faster than in the medicine subspecialties.

These findings also have important implications for the specialty of internal medicine itself. Greater numbers of hours being devoted to patient care should prompt inquiry into whether other important activities, such as teaching or research, might be "losing out." The presence of a significant proportion of physicians working part-time emphasizes the importance of fully accepting and supporting these colleagues. Finally, with a greater awareness of the work hour changes under way, internal medicine physicians can and should contribute to a discussion of the internal medicine workforce and workplace needed in the future.

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