



## Satisfaction, Commitment, and Psychological Well-Being Among HMO Physicians

**Objective:** To identify the factors that predict professional satisfaction, organizational commitment, and burnout among HMO physicians.

**Methods:** Data came from mail surveys of Permanente physicians in the Northwest and Ohio Regions. The average response rate was 80% (N = 608).

**Results:** The single most important predictor for all three outcomes was a sense of control over the practice environment. Other significant predictors included perceived work demands, social support from colleagues, and satisfaction with resources. The relative importance of these predictors varied, depending on the outcome under consideration. All three outcomes were also related to physician age and specialty. Older physicians had higher levels of satisfaction and commitment and lower levels of burnout. Pediatricians were more satisfied and committed to the HMO and were less likely to experience burnout.

**Conclusions:** Physicians who perceive greater control over the practice environment, who perceive that their work demands are reasonable, and who have more support from colleagues have higher levels of satisfaction, commitment to the HMO, and psychological well-being. Interventions and administrative changes that give physicians more control over how they do their professional work and that enhance social supports are likely to improve both physician morale and performance.

### Introduction

The rapid changes in medical practice over the last quarter century have stimulated considerable interest in measuring physicians' perceptions and attitudes about their work.<sup>1</sup> Low levels of job satisfaction among physicians may affect doctor-patient relationships and may compromise quality of care. Dissatisfaction with professional work among physicians has also been associated with inappropriate prescribing patterns,<sup>2</sup> lower levels of patient satisfaction, and decreased patient compliance with prescribed medications and follow-up appointments.<sup>3</sup>

A recent study by researchers at the RAND Corporation found that physician job satisfaction is linked with patient actions that are critical to management of chronic diseases.<sup>4</sup> The RAND researchers followed approximately 1,800 patients with diabetes, heart disease, high blood pressure, or depressive symptoms who visited 186 physicians practicing within HMOs,

large multispecialty groups, and solo practices in three cities. They found that patients are more likely to follow their doctors' advice if their doctors have busy practices, are happy in their work, take time to answer questions, and conduct patient follow-up via phone or office visits.

Physician turnover is also greater in organizations with higher levels of physician dissatisfaction.<sup>5</sup> High turnover can disrupt continuity of care and can increase costs. Finally, high levels of dissatisfaction decrease physicians' commitment to the practice setting and, if persistent, can lead to mental strain and burnout.<sup>6,7</sup> Thus, reasonable levels of physician satisfaction are prerequisites for the stability and long-range success of HMOs.

The research literature suggests that variation in physicians' perceptions derive from two basic sources: 1) the stress inherent in the role of physicians,<sup>8,9</sup> and 2) factors within a practice or work setting.<sup>10-18</sup> Most research has dealt with one or the other of these sources, but no single study has analyzed their relative importance in accounting for differences in physicians' attitudes and perceptions.

The aims of this study were: 1) to determine whether uncertainty in patient care affects physician satisfaction, organizational commitment, and burnout; 2) to determine whether job characteristics of physicians affect satisfaction, commitment, and burnout; and 3) to identify the relative importance of uncertainty versus job characteristics in accounting for variation in these outcomes.

### Methods

#### Data Source/Study Setting

The data for this study, conducted in 1991-1992, were obtained by mail surveys of physicians practicing in two Kaiser Permanente Regions: the Northwest and the Ohio Regions. The two regions serve over 600,000 members and provide integrated, comprehensive inpatient and outpatient care for an enrolled population. The surveys were sponsored and funded in part by Northwest Permanente, P.C. (NWP) and Ohio Permanente Medical Group (OPMG).

#### Study Subjects/Data Collection

The study group included all 526 physicians in NWP the Medical Group affiliated with KP's Northwest Region, and all 235 physicians in OPMG, the Medical Group affiliated with KP's Ohio Region at the time of the study.

The survey instrument was a self-administered questionnaire that included both structured and open-ended questions. It was sent to each physician's home and took about two hours to complete. Each physi-

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cian could receive up to three mail contacts requesting participation in the study. In addition, attempts were made to contact all nonrespondents by telephone after the third mailing. The average response rate for the two medical groups was 80%. Physician respondents in NWP and OPMG were similar in age, but NWP respondents were more likely to be male. NWP also had a higher proportion of family physicians and a smaller proportion of pediatricians. For additional information about the survey design and data collection procedures, see the article by Freeborn and Pope.<sup>19</sup>

Brief descriptions of the study variables are given in Table 1. All are derived from physicians' responses to the questionnaire (self-report). More specific details on the measures and how they were constructed are provided in the Appendix.

#### Outcome Measures: Dependent Variables

"Physician satisfaction" was measured by a modified version of the measure developed by Lichtenstein.<sup>20</sup> Three items were included in the summary measure: the physician's satisfaction with his/

her medical career; whether the physician would choose this setting again, given the choice; and whether the physician would recommend this practice setting to a physician colleague (non-KP).

"Organizational commitment"<sup>21</sup> measures the relative strength of an individual's identification with and involvement in a particular organization (eg, KP).

Burnout was measured by the Tedium Index, a well established measure of "burnout."<sup>22</sup> It represents three aspects of tedium: physical exhaustion, emotional exhaustion, and mental exhaustion.

#### Independent Variables

##### Uncertainty

"Stress from Uncertainty (SUS)"<sup>9</sup> measured physicians' affective reactions to uncertainty in patient care (eg, uncertainty of diagnosis, not being sure what is best for the patient, etc.).

##### Job Characteristics

"Job demands" was measured by a single item that asked physicians, "In order to do a good job, is your total number of patient visits about right, too high, or too low for the number of hours you work?" In

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**Table 1. Outcomes by physician demographic characteristics and by job demands**

Variable	Satisfaction		Organizational commitment		Burnout (Tedium index)	
	Mean	n	Mean	n	Mean	n
<b>Age (yr)</b>						
30-36	3.5**	95	3.6**	95	2.3**	92
37-41	3.5	145	3.7	144	2.4	144
42-47	3.4	162	3.7	162	2.4	162
>48	3.6	187	3.9	188	2.2	186
<b>Gender</b>						
Male	3.5	466	3.7	466	2.3	464
Female	3.5	132	3.7	132	2.3	130
<b>Specialty</b>						
General, internal medicine	3.4**	113	3.6*	114	2.5**	112
Family practice	3.5	63	3.8	63	2.3	64
Pediatrics	3.7	70	3.9	70	2.2	70
Obstetrics-gynecology	3.6	43	3.6	44	2.4	42
Other	3.5	298	3.7	297	2.3	296
<b>Job demands</b>						
Too high	3.3**	170	3.5**	170	2.6**	168
Too low, just right	3.6	352	3.8	353	2.2	352
* p≤0.05						
** p≤0.01						



the analysis, this variable was collapsed into two categories (too high versus about right/too low).

“Control” was a summary measure based on four questionnaire items (ability to influence work environment, opportunity to participate in decision-making, the degree to which lack of autonomy contributes to feelings of stress, and satisfaction with control over schedule).

“Resources” was a modified version of the measure developed by Lichtenstein.<sup>20</sup> It captures physicians’ satisfaction with availability and adequacy of various resources such as support staff and equipment.

“Social support” was a four-item summary measure of the quality of colleague relations (eg, emotional support and helpfulness among physician colleagues).

**Covariates: Other Variables That May Be Related to the Outcomes**

“Workload intensity” was based on two items from the survey: self-reported number of office visits per week, and number of hours per week seeing patients. These two variables were divided to give patient visits per hour.

“Caseload characteristics” were based on each physician’s estimate of the percentage of female patients in his/her caseload and the percentage of patients 65 years old and older in his/her caseload.

“Patient/physician relationship” was based on a series of items that ask physicians about the extent to

which they believe patient-physician interactions are problematic or troublesome (a correlate of dissatisfaction in many studies of HMO physicians).<sup>5,16,18,19</sup>

Physician demographics included age, gender, specialty, time with HMO, and practice location. These were measured by individual survey items.

**Analysis**

The first step in the data analysis was to examine the association between each independent variable and each outcome measure (bivariate analysis). The statistical procedures used included ANOVA and Pearsonian correlations (Tables 1 and 2).

The second step consisted of a series of multivariate analyses (multiple regression) to determine significant predictors of the study outcomes after controlling for the effects of the other variables (covariates) (Tables 3-5). Key conceptual variables and factors that were significant at the  $p \leq 0.05$  level in the bivariate analyses were included in the multiple regression analyses.

**Results**

The three outcome measures were interrelated. Physician satisfaction and organizational commitment were highly correlated ( $r = 0.74$ ;  $p \leq 0.05$ ), and both physician satisfaction ( $r = -0.49$ ) and organizational commitment ( $r = -0.41$ ) were negatively correlated

**Table 2. Relationship among study variables (Pearsonian Correlation Coefficients)**

Variable	Satis.	Commit.	Burnout	Age of phy. (yr)	Yrs. HMO	SUS	Pt./phy. rel	PVPH	% female pts.	% pts. >65 yr	Demands	Control	Resources	Social support
Physician Satisfaction		0.74*	-0.49*	0.14*	0.07	-0.13*	-0.18*	-0.04	-0.05	-0.14*	-0.25*	0.58*	0.40*	0.40*
Organizational Commitment			-0.41*	0.16*	0.07	-0.07	-0.10*	0.02	-0.10*	-0.10*	-0.23*	0.51*	0.37*	0.33*
Burnout (Tedium Index)				-0.19*	0.01	0.33*	0.26*	0.05	0.14*	0.12*	0.34*	-0.45*	-0.28*	-0.25
Age of physician (yr)					0.64*	-0.05	-0.15*	-0.01	-0.03	0.01	-0.13*	0.14*	0.03	0.02
Years with HMO						0.01	-0.09*	0.01	0.01	0.01	-0.08	0.07	-0.02	0.06
Stress from uncertainty (SUS)							0.27*	-0.01	-0.01	0.05	0.13*	-0.10*	-0.08*	0.02
Pt./Phys. relationship								0.11*	0.15*	0.11*	0.23*	-0.24*	-0.14*	-0.14*
No. pt. visits per hour (PVPH)									0.01	-0.11*	0.07	0.03	0.04	-0.15*
% patients female										-0.01	0.13*	-0.10*	0.01	-0.08
% patients >65											0.16*	-0.03	-0.06	0.04
Job demands (perceived workload)												-0.32*	-0.17*	-0.11*
Perceived control													0.49*	0.36*
Resources														0.35*
Social support														

\* $p \leq 0.05$

with burnout ( $p \leq 0.05$ ). That is to say, as physician satisfaction and organizational commitment increased, burnout decreased.

### Bivariate Analyses

All three outcomes were associated with physician age and specialty (Table 1). Older physicians (>48 years of age) had higher mean satisfaction and commitment scores than younger physicians, and burnout scores were lower for younger (30-36 years of age) physicians and for older physicians (>48 years of age) (when compared with physicians in the two middle age categories). Pediatricians had higher mean satisfaction and commitment scores than physicians in other specialty categories. Compared with other specialty categories, general internal medicine had the lowest mean satisfaction score and the highest mean burnout score.

Stress from uncertainty was weakly correlated with physician satisfaction ( $r = -.13$ ;  $p \leq 0.05$ ) and was unrelated to organizational commitment (Table 2). Stress from uncertainty was more highly correlated with burnout (Tedium Index) than with physician satisfaction or organizational commitment ( $r = 0.33$ ;  $p \leq 0.05$ ). Physicians with higher stress from uncertainty were more likely to experience burnout (Table 2).

Job characteristics were significantly related to all three outcomes (Tables 1 and 2). Physicians who felt their job demands were too high had significantly lower mean satisfaction and commitment scores and significantly higher burnout scores than physicians who felt their job demands were about right/too low (Table 1). Perceived control, resources, and social support were significantly and positively correlated with both physician satisfaction and organizational commitment (Table 2). These factors were also significantly related to burnout, but the coefficients were lower than those for satisfaction and commitment. In the case of burnout, the correlations were negative: as perceived control, resources, and social supports increased, burnout decreased.

In terms of the covariates, intensity of workload (patients seen per hour) did not significantly affect any of the outcomes. The patient-physician interaction variable was weakly correlated with the outcomes, and the findings were similar for the caseload variables (percent patients female, percentage patients 65 years of age and older) (Table 2).

### Multivariate Analyses

Perceived control was the single most important predictor of physician satisfaction after other factors were taken into account. Other significant predictors included social support, stress from uncertainty, spe-

**Table 3. Predictors of satisfaction (stepwise regression)**

Predictor variables	Satisfaction		
	R <sup>2</sup>	R <sup>2</sup> Change	Beta
Perceived control	0.353	0.353	0.441*
Social support	0.389	0.036	0.209*
General internal medicine+	0.403	0.014	-0.057
Stress from uncertainty	0.411	0.008	-0.085*
Pediatrics+	0.418	0.007	0.099*
Resources	0.425	0.007	0.096*
Obstetrics-gynecology+	0.429	0.004	0.074*
Job demands (perceived workload)	0.432	0.003	-0.058

Note: Variables that did not enter the model include physician's age, percent patients female, percentage patients >65 yr, patient/physician relationship, and family practice.

\*  $p \leq 0.05$   
 + Reference group = other



*“Perceived control over the practice environment was also the single most important predictor of physician burnout. Stress from uncertainty in patient care, job demands, and social support also affected burnout levels among physicians.”*

cialty, and resources (Table 3). The model explained approximately 43% of the total variation in physician satisfaction ( $R^2 = .432$ ). Perceived control, social support, specialty, and resources were significant predictors of commitment (Table 4), but the percentage of variation explained was smaller (35%;  $R^2 = .354$ ).

Perceived control was the most important predictor of burnout, followed by stress from uncertainty and job demands (perceived workload) (Table 5). Other significant predictors were social support, physician age, and characteristics of the physicians' caseloads (percentage of female patients, percentage of patients 65 years of age and older). The model accounted for 36% of the total variation in the burnout variable (Tedium Index) ( $R^2 = .358$ ).

### Summary/Discussion

Perceived control over the practice environment, support from colleagues, and satisfaction with availability of resources were associated with higher levels of physician satisfaction and organizational commitment. Stress from uncertainty in dealing with patients affected satisfaction adversely but was unrelated to level of organizational commitment. There were also differences in physician satisfaction and organizational commitment by specialty. Pediatricians were more satisfied and more committed than other specialists, a con-

sistent finding in other studies of HMO physicians.<sup>16,19,23</sup>

Perceived control over the practice environment was also the single most important predictor of physician burnout. Stress from uncertainty in patient care, job demands, and social support also affected burnout levels among physicians. Physicians with less perceived control, greater stress from uncertainty, higher job demands, and fewer social supports were at greater risk for burnout. Other correlates of burnout included physician age and characteristics of a physician's caseload. Higher percentages of female and older patients were associated with higher levels of physician burnout.

The problem with our study and with most of these studies is that they are cross-sectional. There is a strong need for prospective data and longitudinal studies on the effects of physician dissatisfaction, burnout, and other measures of physician psychological well-being. Better measures of physician satisfaction<sup>8,20</sup> as well as more objective measures of workload and practice characteristics are also needed to clarify the real risk factors for practitioner dissatisfaction and burnout.<sup>24</sup> Our study has many of these same problems. Another limitation is that it focused on only one form of HMO (the nonprofit group model) and was limited to two KP sites. In addition, many changes have occurred in these practice sites since the early 1990s, and the larger

**Table 4. Predictors of organizational commitment (stepwise regression)**

Predictor variables	Organizational commitment		
	R <sup>2</sup>	R <sup>2</sup> Change	Beta
Perceived control	0.301	0.301	0.412*
Social support	0.322	0.021	0.151*
Pediatrics+	0.333	0.011	0.114*
Resources	0.341	0.008	0.095*
Age of physician	0.347	0.006	0.081*
Family practice	0.351	0.004	0.059
Job demands (perceived workload)	0.354	0.003	-0.060

Note: Variables that did not enter the model include percentage patients female, percentage patients >65 yr, stress from uncertainty, patient/physician relationship, internal medicine specialty, and obstetrics-gynecology specialty.

\*  $p \leq 0.04$

+ Reference group = other

medical environment has also changed dramatically.

Despite these limitations, our results confirm the growing evidence from a variety of occupations and settings that workers who perceive more control over their work are healthier, happier, more satisfied, and more productive. Physicians are no exception, as Wagner points out:<sup>24</sup> "Bureaucratic efforts to micromanage their (doctors) patient care, or control their staff or work setting need careful reexamination."

### Implications for Physician Behavior

Does it matter if physicians are dissatisfied, lacking in commitment, or burned out? What's the quality of the evidence regarding the relation between physicians' attitudes and perceptions and their actual behavior?

Most studies have examined physician satisfaction and its impact on various physician outcomes. The evidence is fairly strong in terms of physician turnover. A consistent finding in the research literature is that organizations with higher levels of physician dissatisfaction also have higher physician turnover rates. This finding is important because of its implications for organizational effectiveness. As Lichtenstein<sup>5</sup> points out, "The task of retaining physicians is a crucial one, not only because the organization must maintain its own stability and predictability, but also because the organization must seek to maintain the sta-

bility of the doctor-patient relationship and the continuity of care provided by physicians to patients."

As mentioned earlier, some studies also suggest that physician satisfaction can influence patient satisfaction,<sup>3,5,25</sup> which has consequences for membership retention in HMOs.<sup>19</sup> The evidence is weaker regarding the relation between physician satisfaction and quality of care, but a few studies have found that physician dissatisfaction can adversely affect quality.<sup>2,4</sup> The findings of the Medical Outcomes Study<sup>4</sup> suggest that patient compliance is affected by the attitudes of physicians and that breakdowns in compliance can have serious adverse effects, particularly for patients with chronic diseases.

Dissatisfied physicians may also have more costly practice styles. Several studies have found that dissatisfied physicians use more total outpatient procedures and make more referrals than physicians who are satisfied, even after adjusting for case-mix and other covariates.<sup>26,27</sup> Whether these differences affect outcomes is unclear, but greater resource use by physicians certainly increases the cost of care.

Few studies, if any, have examined how level of commitment to an organization (eg, KP) influences physician behavior, but because organizational commitment and physician satisfaction were so highly correlated in this study, one might expect that the effects would be

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<b>Table 5. Predictors of burnout (stepwise regression)</b>			
<b>Predictor variables</b>	<b>Burnout</b>		
	<b>R<sup>2</sup></b>	<b>R<sup>2</sup> Change</b>	<b>Beta</b>
Perceived control	0.190	0.190	-0.289*
Stress from uncertainty	0.276	0.086	0.272*
Job demands (perceived workload)	0.314	0.038	0.162*
Social support	0.326	0.012	-0.127*
Age of physician (yr)	0.339	0.013	-0.127*
Percentage patients female	0.349	0.010	0.105*
Percentage patients >65 yr	0.355	0.006	0.081*
Family practice+	0.358	0.003	-0.055
Note: Variables that did not enter the model include patient/physician relationship, satisfaction with resources, internal medicine specialty, pediatrics specialty, and obstetrics-gynecology specialty.			
* p≤0.04 + Reference group = other			



**“Organizations do not succeed on the basis of rational incentives alone but by inducing suitable emotions—commitment, loyalty, satisfaction, and trust—in their participants. Internalized motivation is the most effective approach for enhancing performance of workers in any setting.”<sup>11,12,28</sup>”**

similar to satisfaction. Well-designed empirical studies on the effects of physician burnout are also sparse, but the few existing studies suggest that burned-out physicians have more problems relating to patients. Their quality of care may also suffer.<sup>6,7,10,12,25</sup>

The tendency in today's competitive medical environment is to emphasize financial incentives and to increase scrutiny of medical decision-making in order to reduce costs and increase productivity. These mechanisms increase the tension in clinical decisions and can have unanticipated consequences with respect to physician morale and performance. As many scholars have pointed out, organizations do not succeed on the basis of rational incentives alone but by inducing suitable emotions—commitment, loyalty, satisfaction, and trust—in their participants. Internalized motivation is the most effective approach for enhancing performance of workers in any setting.<sup>11,12,28</sup> ❖

*Acknowledgments: I wish to thank and acknowledge the important contributions of Ralph Schmoltdt, PhD, and Harvey D. Klevit, MD, NWP Physician Emeritus. Drs. Schmoltdt and Klevit assisted in the design of the original surveys and played key roles in their implementation. Special thanks are also in order for Ron Potts, MD, Medical Director of the Ohio Permanente Medical Group (OPMG) at the time of the survey. His support and assistance were crucial for the success of the OPMG survey. I also recognize with thanks those Northwest and Ohio Permanente physicians who made this study possible by their participation in the surveys. Their investment of time and energy is greatly appreciated. Finally, I'd like to thank Vicky Burnham for her skilled research assistance and her editing expertise during manuscript preparation.*

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## Appendix: Measures Global Satisfaction

The global satisfaction measure was a modified version of the global satisfaction measure developed by Richard Lichtenstein.<sup>20</sup> It was composed of three questionnaire items: Q.121. "In general, how satisfied are you with your career in medicine so far?"; Q.125. "If a physician friend of yours told he/she was interested in taking a position similar to yours, what would you tell him/her?"; Q.126. "If you could choose all over again, would you choose KP as a place to practice?" The values for each question were reversed so that a higher score represented higher global satisfaction. The new values for each of the questions were as follows: Q.121. "1=very dissatisfied, 2=dissatisfied, 3=satisfied, 4=very satisfied"; Q.125. "1=I would advise against it, 2=I would have doubts about recommending it, 3=I would have no trouble in recommending this position, 4=I would strongly recommend this position"; Q.126. "1=would definitely not choose KP, 2=would

probably not choose KP, 3=not sure, 4=would probably choose KP, 5=would definitely choose KP." The global satisfaction score was produced by summing the values of the individual items for each person and dividing by the number of items answered by the individual. If the number of missing responses was >1, the scale was not scored for that individual. Cronbach's coefficient alpha for NWP+OPMG was 0.72.

### Organizational Commitment

The organizational commitment score was a modified version of the Organizational Commitment Questionnaire (OCQ) developed by Porter (21). The eight items (Q119a to Q119h) were as follows: Q.119a. "I am willing to put in a great deal of effort beyond that normally expected in order to help this organization to be successful"; Q.119b. "I talk up this organization to my friends as a great organization to work for"; Q.119c. "I find that my values and the organization's values are very similar"; Q.119d. "I am proud to tell others that I am part of this organization"; Q.119e. "This organization really inspires the very best in me in the way of job performance"; Q.119f. "I am extremely glad that I chose this organization to work for over others I was considering at the time I joined"; Q.119g. "I really care about the fate of this organization"; Q.119h. "For me this is the best of all possible organizations for which to work." A five-point Likert scale was used and was reversed so that the higher score would indicate a higher commitment to the organization. The reversed scale was as follows: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly Agree. The organizational commitment score was produced by summing the scores of the individual items for each person and dividing by the number of items answered by the individual. Those individuals who did not answer any of the eight items were excluded (n=4). Only one other individual did not respond to all items (ie, responded to six of the eight). That score was divided by six. Cronbach's coefficient alpha for the eight standardized items for NWP+OPMG was 0.88.

### Burnout: Tedium Index

The primary burnout measure is a modified version of the Tedium Index developed by Pines, Aronson, and Kafry.<sup>22</sup> This measure represents three aspects of tedium: physical exhaustion, emotional exhaustion, and mental exhaustion. The 22 items (Q.21a to Q.21v) were presented in random order and were evaluated on a five-point scale: 1=never, 2=seldom, 3=sometimes, 4=frequently, 5=always. They are included in the basic question, "While at work, how often do you have any of the following experiences?" Q.21a. "Being tired;" Q.21b. "Feeling depressed"; Q.21c. "Having a good day"; Q.21d. "Being physically exhausted"; Q.21e. "Being emotionally exhausted"; Q.21f. "Being happy;" Q.21g. "Being 'wiped out';" Q.21h. "Feeling 'burned-out';" Q.21i. "Being unhappy;" Q.21j. "Feeling run-down;" Q.21k. "Feeling trapped;" Q.21l. "Feeling worthless;" Q.21m. "Being weary;" Q.21n. "Being troubled;" Q.21o. "Feeling

disillusioned and resentful about people;" Q.21p. "Feeling angry;" Q.21q. "Feeling weak;" Q.21r. "Feeling hopeless;" Q.21s. "Feeling rejected;" Q.21t. "Feeling optimistic;" Q.21u. "Feeling energetic;" Q.21v. "Feeling anxious." The scale was reversed for four of the items (having a good day, being happy, feeling optimistic, and feeling energetic). The overall index score (Tedium Score) was produced by summing the scores of the individual items for each person and dividing by the number of items answered by the individual. A higher score indicated higher tedium/burnout. If all of the items had missing responses, the scale was not scored for that individual. Cronbach's coefficient alpha for the 22 standardized items for NWP+OPMG was 0.94.

### Physicians' Reactions to Uncertainty

The Stress from Uncertainty measure is a modified version of the Stress from Uncertainty scale developed by Gerrity et al.<sup>8</sup> A factor analysis and a correlational analysis were used to compare our results with those of Gerrity et al. The 13 items (Q.56a to Q.56m) were evaluated on a five-point scale: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree. The 13 items were included in the basic question, "Please indicate the extent to which you agree or disagree with the following statements:" Q.56a. "The uncertainty of patient care often troubles me;" Q.56b. "Not being sure of what is best for a patient is one of the most stressful parts of being a physician;" Q.56c. "I am tolerant of the uncertainties present in patient care;" Q.56d. "I find the uncertainty involved in patient care disconcerting;" Q.56e. "I usually feel anxious when I am not sure of a diagnosis;" Q.56f. "When I am uncertain of a diagnosis, I imagine all sorts of bad scenarios—patient dies, patient sues, etc.;" Q.56g. "I am frustrated when I do not know a patient's diagnosis;" Q.56h. "I fear being held accountable for the limits of my knowledge;" Q.56i. "Uncertainty in patient care makes me uneasy;" Q.56j. "I worry about malpractice when I do not know a patient's diagnosis;" Q.56k. "The vastness of the information physicians are expected to know overwhelms me;" Q.56l. "I frequently wish I had gone into a specialty or subspecialty that would minimize the uncertainties of patient care;" Q.56m. "I am quite comfortable with the uncertainty in patient care." Eleven of the items were reversed to ensure that a greater score represented a greater stress from uncertainty. The Stress from Uncertainty score was produced by summing the 13 individual items for each person and multiplying this sum by (13 divided by (13 minus the number of missing responses)). If the number of missing responses was >5, the scale was not scored for that individual. Cronbach's coefficient alpha for the 13 standardized items for NWP+OPMG was 0.88 (0.90 for Gerrity et al.), demonstrating excellent internal consistency for the scale items.

### Perceived Control

This measure was composed of four questionnaire items: Q.5d. "How satisfied are you with the ability to



impact your work environment?"; Q.5e. "How satisfied are you with the opportunity to participate in making decisions that affect your clinical practice or professional/clinical duties?"; Q.20p. "How much does the lack of autonomy contribute to your feelings of stress?"; and Q.76c. "In general, how satisfied are you with control over your own work schedule?" The values for each question were reversed so that a higher score represented higher perceived control (more satisfied with impacting work environment, more satisfied with participation in decision-making, less stress from autonomy, and more satisfied with control over work schedule). The new values for each of the questions were as follows: Q.5d. "1=very dissatisfied, 2=dissatisfied, 3=neutral, 4=satisfied, 5=very satisfied;" Q.5e. "1=very dissatisfied, 2=dissatisfied, 3=neutral, 4=satisfied, 5=very satisfied;" Q.20p. "1=very great deal of stress, 2=great deal of stress, 3=moderate stress, 4=very little stress, 5=no stress at all;" Q.76c. "1=very dissatisfied, 2=dissatisfied, 3=neutral, 4=satisfied, 5=very satisfied." This measure was produced by summing the values of the individual items for each person and dividing by the number of items answered by the individual. If the number of missing responses was >1, the scale was not scored for that individual (no individual had all questions missing). Cronbach's coefficient alpha for the standardized variables for NWP+OPMG is 0.81.

#### **Social Support: (Physician Relations)**

This measure was composed of four items from one question: Q.7a. "How would you rate the quality of the working relationships among NWP/OPMG physicians?"; Q.7b. "How would you rate the quality of the helpfulness among NWP/OPMG physicians?"; Q.7c. "How would you rate the quality of the emotional support among NWP/OPMG physicians?"; Q.7d. "How would you rate the quality overall of relations among NWP/OPMG physicians?" The values for each question were reversed so that a higher score represented a higher positive evaluation of physician relations. The new values for each of the questions were as follows: 1=negative, very negative; 2=neutral; 3=positive, very positive. The physician relations score was produced by summing the values of the individual items for each person and dividing by the number of items answered by the individual. If the number of missing responses was >1, the scale was not scored (no individual had all questions missing). Cronbach's coefficient alpha for the standardized variables for NWP+OPMG was 0.87.

#### **Satisfaction with Resources**

This measure was a modified version of the measure developed by Richard Lichtenstein.<sup>20</sup> His measure was based on 13 questionnaire items whereas our measure used eight: Q.6b. "How satisfied are you with your department's nursing team?"; Q.6c. "How satisfied are you with the clerical staff in your medical office?"; Q.6d. "How satisfied are you with the equipment in your medical office?"; Q.6e. "How satisfied are you with the supplies of your medical office?";

Q.6f. "How satisfied are you with the size of your medical office?"; Q.6j. "How satisfied are you with the organization and management of your medical office?"; Q.6n. "How satisfied are you with the medical records of your medical office?"; Q.6p. "How satisfied are you with the pharmacy service of your medical office?" Lichtenstein used a different scale of values (seven-point response scale ranging from "almost never" to "almost always"). We used a five-point response scale ranging from "very satisfied" to "very dissatisfied." The values for each were reversed so that a higher score represented higher satisfaction with resources. The new values for each of the questions were as follows: 1=very dissatisfied, 2=dissatisfied, 3=neutral, 4=satisfied, 5=very satisfied. The measure was produced by summing the values of the individual items for each physician and dividing by the number of items answered by the individual. If the number of items missing was >3, the scale was not scored for that individual. Cronbach's coefficient alpha for the eight standardized items for NWP+OPMG was 0.74.

#### **Patient-Physician Relationships**

Physicians were asked to indicate whether they felt various potential problems with patients were troublesome or not. A correlational analysis and a factor analysis were used to identify which were the most highly interrelated. (The two items excluded were Q.60g. "waiting too long before coming for care" and Q.60f. "language, communication problems.") The seven remaining items were as follows: Q.60a. "How large a problem is over-concern with minor symptoms, running to a doctor for every little thing in your practice?"; Q.60b. "How large a problem is noncompliance with treatment recommendations in your practice?"; Q.60c. "How large a problem is not following advice regarding diet, smoking, or other health practices in your practice?"; Q.60d. "How large a problem is chronic dissatisfaction with treatment or care, i.e. demand unnecessary services or treatment, in your practice?"; Q.60e. "How large a problem is neurotic personality in your practice?"; Q.60h. "How large a problem is shopping around from doctor to doctor and/or "working the system" in your practice?"; Q.60i. "How large a problem is drug-seeking patients with addictive behavior in your practice?" Each item was evaluated on a three-point scale: 1=troublesome problem, 2=somewhat of a problem, 3=little or no problem. The scale was reversed for all seven items to ensure that a greater score represented a greater problem. The problems index was produced by summing the scores of the individual items for each physician and dividing by the number of items answered by the individual. If the number of missing responses was >2, the scale was not scored for that individual. Cronbach's coefficient alpha for the seven standardized items for NWP+OPMG was 0.80.

*A version of this paper was presented at the 68th Annual Pacific Sociological Association Meeting, San Diego, California, April 17-20, 1997.*