



## Medical Care

Issue: Volume 57(5), May 2019, p 334-340

Copyright: Copyright (C) 2019 Wolters Kluwer Health, Inc. All rights reserved.

Publication Type: [Original Articles]

DOI: 10.1097/MLR.0000000000001101

ISSN: 0025-7079

Accession: 00005650-201905000-00003

Keywords: physician work motivation, occupational health, autonomous motivation, controlled motivation, self-determination theory

[Hide Cover](#)

[Original Articles]

# US Physicians' Work Motivation and Their Occupational Health: A National Survey of Practicing Physicians

Moller, Arlen C. PhD<sup>\*+</sup>; Jager, Andrew J. MA<sup>++</sup>; Williams, Geoffrey C. MD, PhD<sup>[S]</sup>; Kao, Audiey C. MD, PhD<sup>[/]</sup>

## Author Information

<sup>\*</sup>Department of Psychology, Illinois Institute of Technology

<sup>+</sup>Department of Preventive Medicine, Northwestern University

<sup>++</sup>Department of Population Health, AHA Center for Health Innovation

<sup>[/]</sup>Ethics Group, American Medical Association, Chicago, IL

<sup>[S]</sup>Department of Medicine, Psychology, and Psychiatry, Center for Community Health and Prevention, University of Rochester Medical Center, Rochester, NY

This study was funded by the American Medical Association.

The authors declare no conflict of interest.

Reprints: Arlen C. Moller, PhD, Illinois Institute of Technology, Tech Central Room 201, 3424 South State Street, Chicago, IL 60616. E-mail:

[amoller@iit.edu](mailto:amoller@iit.edu)

## Abstract

**Background:** Poor occupational health among physicians poses a serious risk both to physicians themselves and the patients under their care. Prior research has found that occupational health among nonphysicians is associated with both degree and type of work motivation.

**Objective:** The main purpose of this article was to assess the association between physician work motivation and their occupational health.

**Research Design:** This study was a national survey of practicing physicians. A split-sample method was used to validate a measure of work motivation adapted for physicians.

**Subjects:** In total, 3589 physicians were selected from the American Medical Association Physician Masterfile among whom 2247 physicians completed a survey (response rate of 62.6%).

**Measures:** Eight-item measure adapted from the Work Extrinsic and Intrinsic Motivation Scale. Grounded in self-determination theory, this measure includes 2 superordinate subscales of autonomous and controlled work motivation (characterized by feeling free and volitional versus pressured or compelled, respectively). Indicators of physicians' occupational health included single-item measures of general health, burnout, job satisfaction, intention to leave their practice, and intention to leave medicine, and a 2-item measure of depression risk.

**Results:** Confirmatory factor analyses found that an 8-item, 2 superordinate (4 subordinate subscale) measure had good factor structure [ $\chi^2_{(14, n=500)}=35.62, P<0.001$ ;  $\chi^2_{(14, n=1747)}=108.85, P<0.001$ ]. Autonomous work motivation was found to be positively related to all 6 indicators of physicians' occupational health. Controlled work motivation was negatively related to 3 of 6 occupational health indicators.

**Conclusions:** Physicians who are more autonomously motivated at work reported having better occupational health. Fostering a health care work environment that supports autonomous motivation may benefit the well-being of physicians and their patients.

To function efficiently and effectively, the health care system requires a healthy and productive physician workforce. Yet ongoing research has found that US physicians are experiencing high rates of burnout, greater intentions to leave the practice of medicine,<sup>1-5</sup> and higher suicide rates than the general workforce.<sup>6,7</sup> Burnout, turnover, and suicide are highly negative outcomes not only for physicians, but also for the patients and the health care systems they serve. Unhealthy physicians may be less likely to provide quality care to their patients, and high retirement and suicide rates can compound existing geographic and specialty workforce shortages.<sup>4,8,9</sup>

Decades of behavioral science research have revealed that both the degree and type of work motivation are critical determinants of worker well-being and organizational success.<sup>10,11</sup> Self-determination theory (SDT) is one conceptualization of human motivation that has been empirically tested in many contexts, including work settings.<sup>12</sup> Fundamental to SDT is the importance of differentiating between autonomous and controlled motivation. Autonomous motivation involves behavior that is willingly undertaken and fully self-endorsed, and is characterized by feeling free and volitional. Controlled motivation, by contrast, involves behavior that feels pressured or compelled by forces external to the self. Within SDT, types of motivation and self-regulation refer to forms of psychological energy fueling and directing human behavior. The term "motivation" is used to denote superordinate categories, while "regulation" denotes subordinate categories (Fig. 1). Autonomous motivation includes intrinsic regulation and integrated regulation. Intrinsic regulation is present when engaging in activities that one finds inherently satisfying through interest, enjoyment, and optimal challenge (eg, diagnosing patients' complex medical problems and then helping patients address them). Integrated regulation is present when an activity or related outcomes are personally meaningful and consistent with a person's core values. Controlled types of motivation include introjected and external forms of regulation. Introjected regulation is driven by self-worth contingencies involving the standards or goals of others that have been only partially internalized; introjection is associated with avoiding feelings of guilt and shame. External regulation is based in the experience of feeling controlled by external tangible rewards such as monetary payments or by avoiding tangible punishments such as monetary fines, loss of licensure, or incarceration. In SDT, each type of regulation falls along an internalization continuum ranging from feeling externally controlled (least autonomous) at one extreme to feeling autonomous with respect to a specific behavior or goal (Fig. 1).

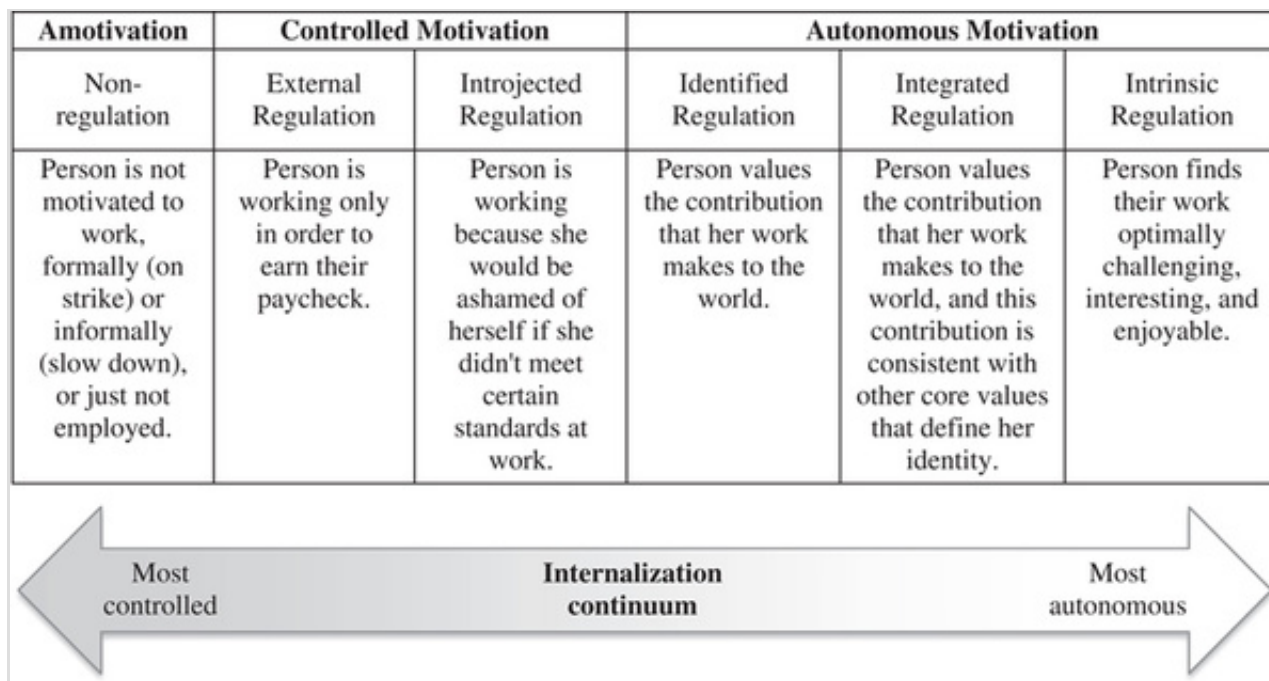


FIGURE 1. The self-determination continuum includes amotivation (lacking in self-determination) to the far left, followed by types of extrinsic motivation that are gradually more self-determined moving left to right, and intrinsic motivation/regulation (invariably self-determined) to the far right.

Over a wide range of occupations, individuals with greater autonomous motivation are generally healthier and more productive than those whose motivation is primarily controlled.<sup>13</sup> Autonomous forms of work motivation have been found to be associated with occupational health indicators such as professional satisfaction, physical and mental well-being, and lower turnover.<sup>11</sup> Controlled forms of work motivation have been found to be negatively or not related to occupational health indicators in studies of attorneys, factory workers, and teachers.<sup>14-16</sup> Despite the potential impact of work motivation on physician well-being,<sup>8,17,18</sup> no prior research to our knowledge has assessed the relationship between work motivation and occupational health among practicing US physicians.

To better understand how autonomous and controlled motivations may be relevant to addressing physicians' occupational health, we conducted a national survey of practicing physicians by adapting a validated, SDT-based measure of general work motivation from Tremblay and associates.<sup>19</sup> We hypothesized that autonomous work motivation would be positively associated with better occupational health and controlled work motivation would be negatively or not associated with occupational health.

## METHODS

### Ethical Review

The study was deemed exempt by the University of Illinois at Chicago Office for the Protection of Research Subjects. The research protocol was seen as involving no more than minimal risk to participants, and although participants could be identified, directly or through their responses, demographics, or codes linked to identifiers, any disclosure of the participants' responses outside the research could not reasonably place them at risk of criminal or civil liability or be damaging to their financial standing, employability, insurability or reputation.

### Power Calculation

To test our hypotheses, our models required adequate power to detect at least *[latin script f]<sup>2</sup>* effect size of 0.02.<sup>20</sup> To be more conservative, we calculated a sample size needed to detect a *[latin script f]<sup>2</sup>* effect size of 0.01. For multivariable regression with a desired statistical power level of 0.8, 12 predictors, and a probability level of 0.05, a minimum sample size of n=1738 is needed to detect a *[latin script f]<sup>2</sup>* effect size of 0.01.

### Data Sources

A random, national sample of 4000 practicing physicians, excluding those in residency and fellowship training, was selected from the American Medical Association (AMA) Physician Masterfile, a database that includes virtually every US physician. Paper-and-pencil surveys were mailed to potential respondents with a postage paid return envelope. Data collection was conducted in 3 waves between October 2014 and May 2015. A \$10 bill was included in the second wave to increase the rate of participation. Respondents were assured confidentiality and were free to skip any questions.

### Measure Specifications

#### Work Motivation

Published work motivation measures were identified and assessed by a cross-disciplinary panel of 8 experts in medicine, public health, social and health psychology, and medical anthropology. Measures of work motivation considered included general,<sup>21</sup> and more specialized scales such as prosocial work motivation.<sup>22</sup> After review, the expert panel selected the Work Extrinsic and Intrinsic Motivation Scale (WEIMS), an 18-item SDT-based measure of work motivation that possessed good content, construct, and criterion validity for our study population.<sup>19</sup> To further tailor the generic WEIMS for physicians, a series of in-depth cognitive interviews were conducted individually with 13 practicing physicians. On the basis of feedback from the cognitive interviews, the 3 items that comprise the "amotivation" or nonregulation WEIMS subscale (referring to when one is unwilling or unable to act) were dropped because interviewees did not consider amotivation to be relevant for physicians.

Next, a split-sample validation was conducted to further refine the physician tailored WEIMS (P-WEIMS). A random sample of 500 cases was selected from the original dataset as a calibration sample and the remaining cases were set aside as a holdout sample. Confirmatory factor analysis (CFA) was conducted using both the calibration and holdout samples (samples 1 and 2, respectively); results are described in the Appendix.

The resulting 8-items P-WEIMS that were used in this study assessed 2 types of work motivation: autonomous (intrinsic and integrated), and controlled (introjected and external). We conducted analyses using both, the 2 superordinate subscales and the 4 subordinate subscales. Items, means, and SDs are reported in [Table 1](#).

Motivation Subscale	Mean (SD)	Subscale Item
Intrinsic	5.87 (0.96)	Because I derive much pleasure from learning new things
Intrinsic	5.79 (1.06)	For the satisfaction I experience from taking on interesting challenges
Integrated	5.83 (1.13)	Because it has become a fundamental part of who I am
Integrated	5.73 (1.10)	Because this work is a part of my life
Introjected	4.78 (1.69)	Because I want to succeed in this work, if not I would be very ashamed of myself
Introjected	5.48 (1.36)	Because I want to be very good at this work, otherwise I would be very disappointed
External	4.33 (1.61)	For the income it provides me
External	5.19 (1.25)	Because it allows me to earn money

Study participants were prompted to respond to motivation items with: "Why do you do your work providing patient care?"  
 We used a 7-point Likert scale with response options ranging from "very true of me" to "very untrue of me."  
 P-WEIMS indicates physician tailored Work Extrinsic and Intrinsic Motivation Scale.

TABLE 1 The 8-item Physician Extrinsic Intrinsic Work Motivation Scale (P-WEIMS)

## Occupational Health

Occupational health indicators that were selected for this study were informed by published research identifying decline among US physicians on various facets of occupational health and SDT-guided research assessing the relationship between worker motivation and well-being.<sup>10,23</sup> The 6 indicators selected were: general health status, depression risk, burnout (specifically, emotional exhaustion), job satisfaction, intentions to leave current practice, and intentions to leave medicine entirely.

Overall health status was measured using a single item from the 36-item Short Form Health Survey: In general, how would you rate your health?<sup>24</sup> Depression risk was measured using the 2-item Patient Health Questionnaire, a validated depression screener that inquires about how frequently an individual has experienced depressed mood and anhedonia over the past 2 weeks.<sup>25</sup> Physician burnout was assessed using a validated single-item measure.<sup>26</sup> This measure of burnout correlates strongly ( $r=0.64$ ,  $P<0.0001$ ) with the Maslach Burnout Inventory emotional exhaustion subscale. Another single-item measure was used to assess job satisfaction.<sup>27</sup> Separate items were used to assess intent to leave current practice within 2 years, and intent to leave medicine as a profession within 2 years.<sup>27</sup>

### Respondent Characteristics

Age, sex, and race/ethnicity were derived from the AMA Physician Masterfile.

## Statistical Analysis

### Multivariable Models

We constructed a series of multivariable regression models to determine associations between physician work motivation and indicators of general health, depression risk, burnout, job satisfaction, and turnover intention. Covariates in all models included physician age, sex, race, and ethnicity. To adjust for the possibility of response bias, we included receipt of \$10 incentive to encourage response to survey as a covariate. Consistent with past research and SDT's premise that autonomous and controlled forms of motivation are dynamically related, we regressed occupational health onto autonomous and controlled forms of motivation simultaneously (thereby controlling for one another). The first multivariable regression model regressed physicians' general health onto the autonomous motivation (the average of intrinsic and integrated regulations) and controlled motivation (the average of introjected and external regulations) subscales. The next multivariable models sequentially replaced general health with depression risk, burnout, job satisfaction, and turnover intention. We also ran multivariable regression models replacing the 2 superordinate motivation subscales with the 4 subordinate regulation subscales (intrinsic, integrated, introjected, and external regulation).

## RESULTS

### Sample Characteristics

Subsequent to the survey mailings, 411 physicians were found to be study ineligible [no longer practicing medicine (71), no longer at the clinical practice on record (54), or survey was returned as undeliverable (286)], and were excluded, bringing the final sample to 3589. From this sample, 2247 physicians provided data for the primary independent variable of interest, that is, the P-WEIMS, for a response rate of 63%.

The mean age of physicians in the sample was 52.3 years (SD=11.3); 68% of respondents were male; 56% were White, 15% Asian, 5% Hispanic or Latino, 4% Black or African American, 2% other, and 19% were listed as "unknown." Compared with nonrespondents nonwhite physicians responded less frequently than white physicians but no other differences were observed. Sample characteristics are summarized in [Table 2](#).

	Overall Sample (N = 3589) [n (%)]	Nonrespondents (N = 1342) [n (%)]	Respondents (N = 2247) [n (%)]	P ( $\chi^2$ )	Split Sample 1 (N = 500) [n (%)]	Split Sample 2 (N = 1747) [n (%)]
Age [mean (SD)]	52.3 (11.3)	52.3 (11.5)	52.6 (11.2)	0.526*	51.5 (11.5)	51.1 (11.4)
Sex						
Female	1142 (32)	419 (31)	729 (32)	0.299	144 (29)	585 (33)
Male	2447 (68)	929 (69)	1518 (68)		356 (71)	1162 (67)
Race/ethnicity						
Asian	490 (14)	195 (15)	295 (13)		79 (16)	216 (12)
Black/African American	138 (4)	63 (5)	75 (3)		19 (4)	56 (3)
Hispanic or Latino	193 (5)	77 (6)	116 (5)	<0.001	31 (6)	85 (5)
White	2024 (56)	692 (52)	1332 (59)		273 (55)	1059 (61)
Other <sup>†</sup>	69 (2)	24 (2)	45 (2)		5 (1)	40 (2)
Unknown	675 (19)	291 (22)	384 (17)		93 (19)	291 (17)

\*Two-tailed *t* test.  
<sup>†</sup>Native American, Native American/Alaskan, and other.

TABLE 2 Characteristics of Physicians who Received a Mail Survey: Respondents and Nonrespondents

### Work Motivation and Occupational Health

Zero order correlations were calculated between all 4 P-WEIMS subscales and all 6 occupational health indicators: (1) physician self-reported overall health, (2) depression risk, (3) professional burnout, (4) satisfaction with current work, (5) intention to leave current practice within the next 2 years, and (6) intention to leave medicine altogether within 2 years. The overall pattern of associations between autonomous work motivation (intrinsic and integrated regulations) and occupational health outcomes were consistent (Table 3). The pattern across all 6 indicators was consistent with our hypotheses. Autonomous work motivation was significantly correlated with all 6 indicators of occupational health (and in the anticipated directions); controlled work motivation was not significantly related to 5 indicators, and was positively (though weakly) correlated with depression risk ( $r=0.05$ ,  $P<0.05$ ).

	Occupational Health Indicators					
	General Health (N = 1743)	Depression Risk (N = 1743) <sup>†</sup>	Burnout (N = 1747)	Work Satisfaction (N = 1739)	Leave Practice (N = 1747)	Leave Medicine (N = 1747)
Mean (SD)	1.85 (0.88)	6.5%	3.84 (0.99)	3.75 (1.15)	3.88 (1.30)	4.23 (1.28)
P-WEIMS subordinate subscales						
Intrinsic regulation	0.12***	-0.14***	-0.19***	0.23***	-0.09***	-0.06*
Integrated regulation	0.51*	-0.11***	-0.20***	0.25***	-0.14***	-0.10***
Introjected regulation	-0.02	0.06*	0.01	0.07**	0.02	0.01
External regulation	0.03	0.02	0.03	-0.01	-0.03	0.03
P-WEIMS superordinate subscales						
Autonomous motivation	0.09***	-0.14***	-0.22***	0.27***	-0.13***	-0.09***
Controlled motivation	0.01	0.05*	0.02	0.04	-0.01	-0.01

Autonomous motivation is comprised of the intrinsic and integrated subscales, while controlled motivation is comprised of the introjected and external subscales.  
<sup>†</sup>Participants with depression risk score  $\geq 3$  were classified as depressed.  
P-WEIMS indicates physician tailored Work Extrinsic and Intrinsic Motivation Scale.  
\* $P < 0.05$ .  
\*\* $P < 0.01$ .  
\*\*\* $P < 0.001$ .

TABLE 3 Correlations Between P-WEIMS Subscales and 6 Indicators of Physicians' Occupational Health

Findings from the multivariable models regression, the 6 different indicators of occupational health onto the 2 superordinate motivation variables, autonomous motivation, and controlled motivation, are summarized in Table 4. As predicted, autonomous work motivation was found to be positively associated with better occupational health across all 6 indicators. By contrast, controlled work motivation was negatively associated with 3 of the occupational health indicators: depression risk (reversed scored), burnout (reverse scored), and work satisfaction. As expected, age was inversely related to general health, and positively related to intentions to leave their practice and to leave medicine; however, age was negatively related to burnout ([beta]=-0.07,  $P < 0.01$ ). In terms of percentage of variance accounted for, the superordinate indicators of work motivation models explained the most variance in intentions to leave medicine (16.6%), followed by work satisfaction (8.3%), intentions to leave practice (8.1%), burnout (7.8%), depression risk (3.4%), and general health (3.4%).

Variables	General Health			Depression Risk			Burnout		
	B	SE B	β	B	SE B	β	B	SE B	β
<b>Model 1</b>									
Autonomous motivation	0.142	0.030	0.122***	-0.200	0.029	-0.173***	-0.287	0.029	-0.245***
Controlled motivation	-0.025	0.025	-0.025	0.107	0.025	0.110***	0.114	0.024	0.115***
R <sup>2</sup>	0.034			0.034			0.078		
F	6.138 <sub>10,1723</sub> ***			5.956 <sub>10,1716</sub> ***			14.473 <sub>10,1718</sub> ***		
<b>Model 2</b>									
Intrinsic regulation	0.151	0.032	0.138***	-0.144	0.031	-0.133***	-0.138	0.031	-0.125***
Integrated regulation	0.02	0.03	0.021	-0.086	0.03	-0.089**	-0.166	0.029	-0.17***
Introjected regulation	-0.047	0.019	-0.064*	0.098	0.019	0.136***	0.09	0.019	0.123***
External regulation	0.025	0.019	0.033	0.009	0.018	0.012	0.027	0.018	0.035
R <sup>2</sup>	0.042			0.040			0.080		
F	6.293 <sub>12,1721</sub> ***			5.968 <sub>12,1714</sub> ***			12.50 <sub>12,1716</sub> ***		
<b>Model 1</b>									
Autonomous motivation	0.345	0.029	0.291***	-0.221	0.029	-0.188***	-0.195	0.028	-0.164***
Controlled motivation	-0.06	0.025	-0.06**	0.045	0.025	0.045	0.021	0.024	0.021
R <sup>2</sup>	0.083			0.081			0.166		
F	15.653 <sub>10,1720</sub> ***			15.168 <sub>10,1723</sub> ***			34.346 <sub>10,1722</sub> ***		
<b>Model 2</b>									
Intrinsic regulation	0.154	0.032	0.138***	-0.03	0.031	-0.027	-0.023	0.03	-0.021
Integrated regulation	0.195	0.03	0.197***	-0.207	0.029	-0.21***	-0.183	0.028	-0.184***
Introjected regulation	-0.04	0.019	-0.055*	0.069	0.019	0.094***	0.047	0.018	0.064*
External regulation	-0.022	0.019	-0.028	-0.016	0.018	-0.02	-0.019	0.018	-0.024
R <sup>2</sup>	0.084			0.091			0.173		
F	13.114 <sub>12,1718</sub> ***			14.320 <sub>12,1721</sub> ***			30.058 <sub>12,1720</sub> ***		

Autonomous motivation is comprised of the intrinsic and integrated subscales, while controlled motivation is comprised of the introjected and external subscales. Both models were adjusted for race (White vs. non-White, Asian vs. non-Asian, Black vs. non-Black, others vs. non-other), ethnicity (Hispanic vs. non-Hispanic), incentive for participation received (yes or no), age, and sex.  
 \* $P < 0.05$ ,  
 \*\* $P < 0.01$ ,  
 \*\*\* $P < 0.001$ .

TABLE 4 Physicians' Work Motivation Predicting 6 Indicators of Physician Occupational Health



Findings from the parallel set of multivariable models regression, the 6 different indicators of occupational health onto the 4 subordinate motivation variables (intrinsic, integrated, introjected, and external regulation) are summarized in [Table 4](#). As expected, the pattern of results was consistent with predictions and the first set of models using the 2 superordinate motivation variables. In terms of percentage of variance accounted for, the more nuanced, subordinate indicators of work regulation models explained the most variance in intentions to leave medicine (17.3%), followed by intentions to leave practice (9.1%), work satisfaction (8.4%), burnout (8.0%), general health (4.2%), and depression risk (4.0%). The 2 forms of autonomous motivation, intrinsic and integrated regulation, were most consistently associated with occupational health indicators, and as predicted, in a uniformly positive direction. Intrinsic regulation was positively associated with general health and work satisfaction, and negatively associated with depression risk and burnout. Integrated regulation was positively associated with work satisfaction, and negatively associated with depression risk, burnout, intentions to leave practice, and intentions to leave medicine. Introjected regulation was positively associated with depression risk, burnout, intentions to leave practice, and intentions to leave medicine, and negatively associated with general health and work satisfaction. External regulation was not significantly related to any of the 6 indicators of occupational health.

## DISCUSSION

Overall, our study results offered empirical support for the main research hypotheses. Higher autonomous motivation (as measured by intrinsic and integrated regulation) was found to be associated with better overall health, lower risk for depression, decreased burnout, increased work satisfaction, and lower intent to leave current practice or medicine entirely. In contrast, higher controlled motivation (as measured by introjected regulation) was found to be associated with lower overall health, greater risk for depression, increased burnout, decreased work satisfaction, and higher intent to leave current practice or medicine entirely. Controlled motivation (as measured by external regulation) was not significantly associated with any of the 6 occupational health indicators assessed in our study.

These findings are relevant in light of ongoing transformation in the way health care is organized and paid for in the United States. Historically, most physicians owned their clinical practices, but 2016 marked the first time that the majority of physicians did not.<sup>28</sup> Today, more physicians are employees as increasing number of clinical practices are purchased by hospitals and other traditional health care entities. More recently, unconventional actors such as private equity and venture capital firms have entered the marketplace and begun to purchase physician practices.<sup>29</sup> Significant changes in practice ownership structures have raised concerns about potential conflicts of values and priorities between health care employers (especially if they are driven by short-term profit maximization) and their physician employees. As we found in this study, physicians who consider their work as a fundamental part of who they are as professionals reported better occupational health. Most physicians view the practice of medicine as a calling and a life commitment to help those in need.<sup>30</sup> Therefore, a work environment and culture that does not adequately support physicians' professional values may create moral and psychological distress or the stress that occurs when institutional constraints make it difficult for one to do what one believes is the right thing to do.

Physicians who derived pleasure from learning new things and taking on interesting challenges at work were also found to report better occupational health. Studies on how physicians allocate their time at work have revealed that a large percentage of their time is spent on tasks such as medical documentation and insurance paperwork. For every hour per day physicians provide direct face-to-face patient care, nearly 2 additional hours are spent on more mundane and less interesting tasks such as medical record keeping and desk work.<sup>31</sup> In light of these time allocation findings, health care delivery organizations that improve workflow processes (eg, previsit laboratory testing, medical scribes, and bundled prescription renewal) and enhance direct engagement with patients may contribute to higher physician work satisfaction and lower burnout. Sustaining such a highly educated workforce is important because replacing physicians who leave their practice or medicine can entail substantial cost. Studies have revealed that the cost of replacing a physician can be 2-3 times a physician's annual salary or upwards of a million dollars.<sup>32</sup> Therefore, health care delivery organizations that foster physician autonomous motivation may be doing the smart thing from an economic standpoint.

As regards to controlled motivation, we found that physicians' sense of disappointment and shame in not being able to do their work well reported poorer occupational health. This finding may not be particularly surprising, but given the high prevalence of depression and suicide among practicing physicians, leaders of health care delivery organizations should focus on creating work environments that support physicians' aspiration to provide the best possible care for their patients. In contrast, we did not find any significant association between motivation to work for financial remuneration and any of the 6 occupational health indicators. Upon initial consideration, this finding seems somewhat surprising. Research has shown that income has a positive relationship with happiness or life satisfaction, but the relationship is not a perfectly linear one. As income increases, its added contribution to life satisfaction becomes smaller. The impact of additional income is greatest among those who have little money, and thus, the occupational health of physicians who are among the highest income earners is less likely to be tied to money.

One important implication concerns what not to do; interventions designed to increase controlled motivation (eg, promoting greater external regulation with financial incentives) may be ineffectual at improving physicians' occupational health.<sup>10,14,19,22,23</sup> In fact, our data suggest that decreasing the salience of extrinsic incentives may improve occupational health. These findings support creating and testing strategies that involve increasing autonomous motivation (ie, intrinsic and integrated forms of work regulation) or decreasing controlled motivation to determine if these changes enhance physician occupational health.

Our study had several limitations. First, the cross-sectional study design does not allow determination of the direction of relations between variables or to assess causality. That said, we can point to prior experimental and longitudinal studies in a variety of contexts that have causally linked differentiated forms of worker motivation to occupational health.<sup>10,12,33</sup> Second, although the response rate for this national sample was good, the respondent group had a lower percentage of minority physicians than the nonrespondent group which may limit the generalizability of our results to the overall population of US physicians. Third, this study relied on physician self-reports. That being said, occupational health indicators such as risk for depression and intent to leave current practice correlates with actual psychiatric symptoms <sup>24</sup> and departures,<sup>34</sup> respectively.

Physicians' occupational health has been declining, and this development has negative ramifications for physicians, patients, and the health care system at large. This study advances our understanding of this important issue by demonstrating that autonomous forms of work motivation were consistently and positively associated with physicians' occupational health, while controlled work motivation was not. As the US health care system changes in response to market forces and societal expectations, studies of interventions that enhance physicians' autonomous motivation are called for. Enhancing autonomous motivation may be more effective than those intended to reduce controlled motivation for improving physician occupational health, and ultimately the health of their patients.

## ACKNOWLEDGMENTS

The authors thank members of the expert panel for their help in the development of the physician work motivation measure. Panelists included Elliott Crigger, PhD; Jane Dillon, MD; Barbara Koenig, PhD; Jerry Penso, MD; Michael Tutty, PhD; Modena Wilson, MD, MPH; Scott Wright, MD, MPH; and Matthew Wynia, MD, MPH.

## APPENDIX: P-WEIMS SPLIT-SAMPLE VALIDATION

Cases for each sample were randomly selected using the RAND formula in Excel (Microsoft; Redmond, WA). These values were then sorted in descending order and the first 500 cases were selected to be in the calibration sample, while the remaining 1747 cases were retained as the holdout sample. CFA was conducted using both the calibration and holdout samples (Samples 1 and 2, respectively), and hypothesis testing was conducted using the holdout sample only. Confirmatory factor analyses on the 15 items identified at the cognitive interview stage resulted in marginally acceptable fit. To further improve fit, the 3 items loading on the "identified" motivation subscale (refers to doing an activity because one values it, but not to the extent that it has become integrated with other core values), and the item with the lowest factor loading for each of the remaining 4 subscales were dropped, rendering a more parsimonious 8-item scale. Using Sample 1, a second CFA with the resulting 8-item, 4-factor model rendered a satisfactory fit:  $[\chi^2]_{(14, N=500)}=35.62, P<0.001$ , ( $[\chi^2]/df$  ratio=2.54; Kline, 1998); Comparative Fit Index=0.98, standardized root mean square residual=0.030, root mean square error of approximation (RMSEA)=0.056, 90% confidence interval RMSEA=0.055-0.074. All items had standardized factor loadings over 0.50 (ranging from 0.59 to 0.99). Each set of 2 indicators also showed mid to high item-to-factor total correlations (>0.80 for each subscale), representing a first indication of construct validity. Using sample 2, CFA with the 8-item, 4-factor model found satisfactory fit:  $[\chi^2]_{(14, N=1747)}=108.85, P<0.001$ , ( $[\chi^2]/df$  ratio=7.78); Comparative Fit Index=0.97, standardized root mean square residual=0.027, RMSEA=0.063, 90% confidence interval RMSEA=0.053-0.075.

## REFERENCES

1. Bodenheimer T, Sinsky C. From triple to quadruple aim: care of the patient requires care of the provider. *Ann Fam Med*. 2014;12:573-576. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)
2. Landon BE, Reschovsky JD, Pham HH, et al. Leaving medicine: the consequences of physician dissatisfaction. *Med Care*. 2006;44:234-242. [Ovid Full Text](#) | [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)
3. Linzer M, Poplau S, Grossman E, et al. A cluster randomized trial of interventions to improve work conditions and clinician burnout in primary care: results from the Healthy Work Place (HWP) study. *J Gen Intern Med*.

2015;30:1105-1111. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

4. Sinsky CA, Dyrbye LN, West CP, et al. Professional satisfaction and the career plans of US Physicians. *Mayo Clin Proc.* 2017;92:1625-1635. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

5. Shanafelt TD, Boone S, Tan L, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med.* 2012;172:1377-1385. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

6. Hampton T. Experts address risk of physician suicide. *J Am Med Assoc.* 2005;294:1189-1191. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

7. Wible P. *Physician Suicide Letters Answered*. Eugene, OR; 2016. [\[Context Link\]](#)

8. Thomas LR, Ripp JA, West CP. Charter on physician well-being. *JAMA.* 2018;319:1541-1542. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

9. Dall T, West T, Chakrabarti W, et al. *The Complexities of Physician Supply and Demand: Projections From 2013 to 2025*. Washington, DC: IHS; 2015. [\[Context Link\]](#)

10. Gagne M, ed. *The Oxford Handbook of Work Engagement, Motivation, and Self-Determination Theory*. Oxford, NY: Oxford University Press; 2014. [\[Context Link\]](#)

11. Gagne M, Forest J, Vansteenkiste M, et al. The Multidimensional Work Motivation Scale: validation evidence in seven languages and nine countries. *Eur J Work Organ Psychol.* 2015;24:178-196. [\[Context Link\]](#)

12. Ryan RM, Deci EL. *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*. New York: Guilford Press; 2017. [\[Context Link\]](#)

13. Howard J, Gagne M, Morin AJS, et al. Motivation profiles at work: a self-determination theory approach. *J Vocat Behav.* 2016;95-96:74-89. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

14. Krieger LS, Sheldon KM. What makes lawyers happy? transcending the anecdotes with data from 6200 lawyers. *George Wash Law Rev.* 2015;83:554. [\[Context Link\]](#)

15. Ilardi BC, Leone D, Kasser T, et al. Employee and supervisor ratings of motivation: main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. *J Appl Soc Psychol.* 1993;23:1789-1805. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

16. Fernet C, Guay F, Senecal C, et al. Predicting intraindividual changes in teacher burnout: The role of perceived school environment and motivational factors. *Teach Teach Educ.* 2012;28:514-525. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

17. Judson TJ, Volpp KG, Detsky AS. Harnessing the right combination of extrinsic and intrinsic motivation to change physician behavior. *JAMA*. 2015;314:2233-2234. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)
18. Kao AC. Driven to care: aligning external motivators with intrinsic motivation. *Health Serv Res*. 2015;50:2216-2222. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)
19. Tremblay MA, Blanchard CM, Taylor S, et al. Work Extrinsic and Intrinsic Motivation Scale: its value for organizational psychology research. *Can J Behav Sci Can Sci Comport*. 2009;41:213-226. [\[Context Link\]](#)
20. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. Hillsdale, NJ: L. Erlbaum Associates; 1988. [\[Context Link\]](#)
21. Pinder CC. *Work Motivation in Organizational Behavior*. New York, NY: Taylor & Francis Group Psychology Press; 2014. Doi:10.4324/9781315734606. [\[Context Link\]](#)
22. Grant AM, Sumanth JJ. Mission possible? the performance of prosocially motivated employees depends on manager trustworthiness. *J Appl Psychol*. 2009;94:927-944. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)
23. Gagne M, Deci EL. Self-determination theory and work motivation. *J Organ Behav*. 2005;26:331-362. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)
24. Brazier JE, Harper R, Jones NM, et al. Validating the SF-36 health survey questionnaire: new outcome measure for primary care. *BMJ*. 1992;305:160-164. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)
25. Kroenke K, Spitzer RL, Williams JBW. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Med Care*. 2003;41:1284-1292. [Ovid Full Text](#) | [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)
26. Rohland BM, Kruse GR, Rohrer JE. Validation of a single-item measure of burnout against the Maslach Burnout Inventory among physicians. *Stress Health*. 2004;20:75-79. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)
27. Friedberg MW, Chen PG, Van Busum KR, et al. Factors affecting physician professional satisfaction and their implications for patient care, health systems, and health policy. *Rand Health Q*. 2014;3:28083306. [360 Link](#) | [\[Context Link\]](#)
28. Murphy B. For first time, physician practice owners are not the majority. *AMA Wire*; May 2017. Available at: <https://wire-ama-assn-org.ezp.lib.rochester.edu/practice-management/first-time-physician-practice-owners-are-not-majority>. Accessed November 21, 2018. [\[Context Link\]](#)
29. Court E. Medical practices have become a hot investment-are profits being put ahead of patients? *MarketWatch*; 2018. Available at: <https://www-marketwatch-com.ezp.lib.rochester.edu/story/doctors-are-being-bought-up-by-private-equity-an>

[d-its-your-health-on-the-line-2018-06-08](#)

. Accessed November 21, 2018. [\[Context Link\]](#)

30. Jager AJ, Tutty MA, Kao AC. Association between physician burnout and identification with medicine as a calling. *Mayo Clin Proc.* 2017;92:415-422. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

31. Sinsky C, Colligan L, Li L, et al. Allocation of physician time in ambulatory practice: a time and motion study in 4 specialties. *Ann Intern Med.* 2016;165:753-760. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

32. Noseworthy J, Madara J, Cosgrove D, et al. Physician burnout is a public health crisis: a message to our fellow health care CEOs. *Health Affairs Blog March*; 2018. Available at:

[www.healthaffairs.org/doi/10.1377/hblog20170328.059397/full/](http://www.healthaffairs.org/doi/10.1377/hblog20170328.059397/full/)

. Accessed November 21, 2018. [\[Context Link\]](#)

33. Olafsen AH, Deci EL, Halvari H. Basic psychological needs and work motivation: a longitudinal test of directionality. *Motiv Emot.* 2017;42:178-189. [360 Link](#) | [\[Context Link\]](#)

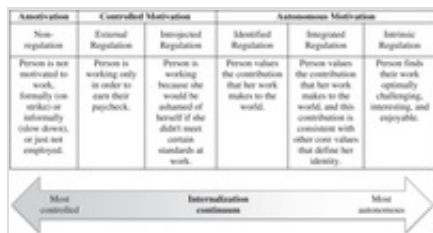
34. Rittenhouse DR, Mertz E, Keane D, et al. No exit: an evaluation of measures of physician attrition. *Health Serv Res.* 2004;39:1571-1588. [360 Link](#) | [Bibliographic Links](#) | [\[Context Link\]](#)

Key Words: physician work motivation; occupational health; autonomous motivation; controlled motivation; self-determination theory

## IMAGE GALLERY

Select All

 Export Selected to PowerPoint



Distraction Tactics	Mean (SD)	Network Size
None	1.07 (1.06)	Because I derive much pleasure from learning new things
Review	1.76 (1.06)	For the satisfaction I experience from solving or overcoming challenges
Rehearsal	4.02 (1.11)	Because it has become a longstanding part of my life
Rehearsal	1.76 (1.06)	Because this leads to a part of my life
Rehearsal	4.23 (1.04)	Because I hope to succeed in the work, if it will benefit the well-being of myself
Rehearsal	4.23 (1.04)	For the pleasure of generalization
Rehearsal	4.23 (1.04)	Because it allows me to work easier

Table 1

	Controlled Sample (N = 1,000) n (%)	Nonregulation (N = 1,000) n (%)	Regulation (N = 1,000) n (%)	High Sample 1 (N = 1,000) n (%)	High Sample 2 (N = 1,000) n (%)
Age (Mean (SD))	52.3 (11.3)	52.3 (11.3)	52.3 (11.3)	52.3 (11.3)	52.3 (11.3)
Female	1047 (52.3)	1047 (52.3)	1047 (52.3)	1047 (52.3)	1047 (52.3)
White	2047 (100)	2047 (100)	2047 (100)	2047 (100)	2047 (100)
Academics	498 (24.9)	498 (24.9)	498 (24.9)	498 (24.9)	498 (24.9)
Phys	150 (7.5)	150 (7.5)	150 (7.5)	150 (7.5)	150 (7.5)
Regulator of Control	191 (9.5)	191 (9.5)	191 (9.5)	191 (9.5)	191 (9.5)
Other	2047 (100)	2047 (100)	2047 (100)	2047 (100)	2047 (100)
Education	498 (24.9)	498 (24.9)	498 (24.9)	498 (24.9)	498 (24.9)

Table 2

Figure 1

	Occupational Health Indicators				
	Control Health (N = 1,000)	Disruptive Health (N = 1,000)	Stress (N = 1,000)	Work Satisfaction (N = 1,000)	Lower Practice (N = 1,000)
Mean (SD)	1.07 (1.06)	1.07 (1.06)	1.07 (1.06)	1.07 (1.06)	1.07 (1.06)
95% CI	0.95-1.19	0.95-1.19	0.95-1.19	0.95-1.19	0.95-1.19
Internalization	0.22***	0.22***	0.22***	0.22***	0.22***
External Regulation	0.22***	0.22***	0.22***	0.22***	0.22***
Introjected Regulation	0.22***	0.22***	0.22***	0.22***	0.22***
Identified Regulation	0.22***	0.22***	0.22***	0.22***	0.22***
Integrated Regulation	0.22***	0.22***	0.22***	0.22***	0.22***
Intrinsic Regulation	0.22***	0.22***	0.22***	0.22***	0.22***
Autonomous Motivation	0.22***	0.22***	0.22***	0.22***	0.22***
Controlled Motivation	0.22***	0.22***	0.22***	0.22***	0.22***

Table 3

Variable	General Health			Depression Risk			Burnout			
	B	SE B	p	B	SE B	p	B	SE B	p	
Model 1										
Autonomous motivation	0.142	0.026	0.0000000	-0.280	0.029	<0.0000000	-0.297	0.029	<0.0000000	
Controlled motivation	-0.029	0.029	0.322	0.247	0.027	0.0000000	0.214	0.029	0.0000000	
F	0.028			0.029			0.028			
R <sup>2</sup>	0.176	0.176			0.176			0.176		
Model 2										
Autonomous motivation	0.173	0.027	0.0000000	-0.146	0.031	<0.0000000	-0.130	0.031	<0.0000000	
Controlled motivation	0.027	0.027	0.322	0.280	0.029	0.0000000	0.250	0.029	0.0000000	
Integrated regulation	-0.027	0.029	0.322	0.029	0.029	0.322	0.027	0.029	0.322	
Identified regulation	0.027	0.029	0.322	0.029	0.029	0.322	0.027	0.029	0.322	
F	0.200	0.200			0.200			0.200		
R <sup>2</sup>	0.200	0.200			0.200			0.200		
Model 3										
Autonomous motivation	0.142	0.026	0.0000000	-0.273	0.029	<0.0000000	-0.190	0.029	<0.0000000	
Controlled motivation	-0.029	0.029	0.322	0.247	0.027	0.0000000	0.214	0.029	0.0000000	
F	0.028			0.029			0.028			
R <sup>2</sup>	0.176	0.176			0.176			0.176		
Model 4										
Autonomous motivation	0.173	0.027	0.0000000	-0.146	0.031	<0.0000000	-0.130	0.031	<0.0000000	
Controlled motivation	0.027	0.027	0.322	0.280	0.029	0.0000000	0.250	0.029	0.0000000	
Integrated regulation	-0.027	0.029	0.322	0.029	0.029	0.322	0.027	0.029	0.322	
Identified regulation	0.027	0.029	0.322	0.029	0.029	0.322	0.027	0.029	0.322	
F	0.200	0.200			0.200			0.200		
R <sup>2</sup>	0.200	0.200			0.200			0.200		

Table 4

[Back to Top](#)

[About Us](#)   [Contact Us](#)   [Privacy Policy](#)   [Terms of Use](#)

© 2019 Ovid Technologies, Inc. All rights reserved. OvidUI\_04.01.00.001, SourceID 118528