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**Physician Characteristics and Treatment Modalities in Relation to Patient Satisfaction Scores  
in Outpatient Primary Care Practices**

Efraim Berkovich, Penn Wharton Budget Model

and

Alison J. Leff, Bryn Mawr Medical Specialists Association

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PENN WHARTON BUDGET MODEL  
3440 Market Street, Suite 300  
Philadelphia, PA 19104

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## **ABSTRACT**

**Background:** Assessing patient experiences with healthcare and publicly reporting this information is increasingly prevalent. Patients use this data when reviewing physicians and hospital systems. Measurements of patient satisfaction are increasingly integrated into payment policies from insurance companies.

**Objective:** This study analyzes (1) the relationship of physician characteristics and treatment modalities to patient satisfaction scores among primary care physicians and (2) the relationship of higher patient satisfaction scores to compliance with health maintenance objectives like mammography and colonoscopy.

**Main Measures:** CAHPS survey as administered by Press Ganey for Main Line Health Care physicians in suburban Philadelphia. Survey data obtained on 115 physicians over 345 “doctor-years.” Patient data identified by ICD9/10 codes linked to chief complaints of (1) upper respiratory illness (2) back pain and (3) fatigue, depression and anxiety. Treatment modalities groupings include (a) prescriptions for antibiotics (b) prescriptions for narcotics, (c) prescriptions for stimulants, (d) prescriptions for benzodiazepines, and (e) orders for radiologic imaging. Rates of colonoscopies and mammograms per provider were obtained for the year 2017.

**Key Results:** Providers in practice for longer periods of time received higher top box scores. There is a significant difference in top box scores for female physicians years 0-3 and 4-9 when compared to male physicians in practice more than 10 years. There is a significant relationship between top box scores and the physician's rate of writing prescriptions for benzodiazepines, narcotics and stimulants. There is a positive correlation between top box score and compliance with mammography and colonoscopy screenings.

**Conclusions:** Press Ganey top box score correlates with physician gender, years of experience, and certain treatment modalities. There is a correlation between high patient satisfaction scores and rate of mammography and colonoscopy compliance. Our results do not imply a causative relationship but may be suggestive that one exists.

It is argued that assessing patient experiences with healthcare and publicly reporting this information (a) helps patients choose among healthcare providers and plans and (b) stimulates, guides and monitors healthcare quality improvement efforts. The Agency for Healthcare Research and Quality (AHRQ) launched the Consumer Assessment of Healthcare Providers and Systems (CAHPS) project in 1995 to develop standardized surveys to assess the experience of consumers receiving different types of health care [1]. Numerous studies have been done which demonstrate the reliability and construct validity of the CAHPS surveys [2] [3] [4] [5]. The Patient Protection and Affordable Care Act (PPACA) (HR 3590) mandated that the Centers for Medicare and Medicaid Services (CMS) establish several public reporting and payment programs that incorporate information collected using the CAHPS surveys [3].

The Medicare Provider Payment Modernization Act of 2014 (H.R. 4015) ended the sustainable growth rate formula for determining physician reimbursement, supporting a reimbursement model that increasingly ties reimbursement to health care quality measures such as patient satisfaction [6]. The Press Ganey Medical Practice survey has become the most commonly used survey of outpatient satisfaction in the United States [7]. Public reporting of this data on websites is increasingly prevalent, allowing patients to use this data when reviewing physicians and hospital systems [8] [9] [10]. The measurement of patient satisfaction is increasingly becoming integrated into payment policies from insurance companies as well as individual employers [6] [11].

Ongoing research evaluates the association between these measured patient experiences and other indicators of health care quality. Some studies show that patient

satisfaction correlates positively with clinical outcomes [12] [13] [14] [15] [16]. Patient-centered care has been shown to be associated with less diagnostic testing and specialty referral, fewer hospitalizations and readmissions and lower costs [12]. Contradictory studies, however, have shown that there is either no correlation between patient satisfaction and clinical outcomes or an inverse correlation [17] [18] [19] [20]. For example, one study in a nationally representative sample showed that higher patient satisfaction was associated with less emergency department use but with greater inpatient use, higher overall health care and prescription drug expenditures and increased mortality [17].

Studies have been done to determine factors that may influence patient satisfaction. It has been found that individuals of lower socioeconomic status and less education tend to be less satisfied with their care [21]. Other work suggests that patient satisfaction scores correlate with the gender of the patient relative to the gender of the provider [8] [12] [22] [23] [24] [25]. The ordering of medical diagnostic tests, such as X-rays for back pain has also been shown to correlate with patient satisfaction [26]. Patient expectations of potential treatments can influence whether a patient feels “satisfied” after evaluation by their provider [3] [5] [27] [28] [29] [30] [31]. Many of these studies however, have used modalities other than the CAHPS surveys to measure patient satisfaction.

Investigations of behavioral responses by healthcare providers to the implementation of patient satisfaction based work environments show mixed results. Some suggest that patient satisfaction survey utilization may promote, under certain circumstances, job dissatisfaction, attrition, and inappropriate clinical care among some physicians [32] [33] [34]. Since patient

satisfaction scores affect the level of payment that providers and hospitals receive from third-party health plan payers and employers, providers may strategically change their treatment of patients. The change in care provided may lead to outcomes both desired and not desired by policy-makers and payers. Although patient satisfaction has been reported in the hospital setting for many years, it is becoming increasingly common in the outpatient setting. This study seeks to assess the relationship of particular physician characteristics and treatment modalities to patient satisfaction scores among primary care providers in the outpatient setting and the relationship of higher patient satisfaction scores to patient compliance with health maintenance objectives like mammography and colonoscopy.

## **METHODS AND DATA**

Our data panel includes CAHPS survey data as administered by Press Ganey for Main Line Health Care. Main Line Health Care is an outpatient health service system located primarily in suburban Philadelphia. Press Ganey surveys are mailed to 25 patients who have been seen by a particular provider once in the prior 30 days. The remaining patients receive an email survey if there is an email on record [35]. Press Ganey reports that 30 responses for the survey of a particular provider are considered statistically valid. However, the scores are calculated based on any number of received surveys whether or not the 30 threshold is reached.

Main Line Health Care assesses providers on the basis of Press Ganey "top box scores". According to Press Ganey, a top box score for a single survey question is calculated by taking the percentage of respondents who gave the highest level answer, which can be on a number scale (for example, 0 to 10) or a frequency scale (for example, "never", "usually", or "always").

For instance, if 10 patients respond to the question "Overall Doctor Rating 0-10" and 8 of them give the answer "9-10" (considered for this question to be the highest level), then the top box score for that question is 80%. Physicians with the same top box scores may have differences in the remaining distribution of responses. In the example above, the physician receives the top box score of 80% regardless of whether the remaining two responses were 0 or 8.

While we have data on patient responses to a variety of survey questions, such as whether the patient would recommend the provider office, whether the provider spent enough time with the patient, whether the provider knew important medical information and patient history, and so on, we focus our analysis on the overall doctor rating question as the basis for the "top box score" comparison for two main reasons. First, our analysis indicates that high responses to one question correlate highly with high responses to other questions. Second, the numeric overall doctor rating provides a finer gradation of responses rather than the other questions which tend to have yes/no type answers.

Survey data were obtained on practicing physicians and midlevel providers in the health system from February 1, 2014 (when Press Ganey scores were first collected) until August 31, 2017. We restrict our sample to physicians who had over 300 kept appointments per year for a total of 115 physicians over 345 "doctor-years." The panel includes 54 female and 61 male providers. There are 154,416 patient survey responses to the overall doctor rating question in our panel. Survey responses are anonymous but patient gender and age grouping are given.

We obtained data on patient encounters associated with presenting complaints identified via ICD9/10 codes and treatment modalities linked to the physicians in our survey

panel. Presenting complaints included (1) upper respiratory illness, (2) back pain, and (3) fatigue, depression and anxiety. Treatment modalities groupings we examine include: (a) prescriptions for antibiotics, (b) prescriptions for narcotics, (c) prescriptions for stimulants, (d) prescriptions for benzodiazepines, and (e) orders for radiologic imaging. Since the specific complaints of back pain and mental health concerns often require continuous treatment, data were obtained on medications prescribed that were not assigned to a specific patient visit. In particular, a patient may request a refill for a medication that had previously been prescribed while in the office for a visit associated with an unrelated ICD code.

## **Statistical Analysis**

Our primary statistical tool is to estimate regressions on (a) physician propensity for treatment modalities and average patient satisfaction scores and (b) physician characteristics and average patient satisfaction scores. Because survey data are anonymous, we cannot link directly a particular treatment modality to a particular survey response. Instead, we have aggregate patient responses for each provider, and we compare relationships between average patient score and overall treatment modality rates for the provider. We use simple linear regressions to identify correlations between individual treatment modalities and top box score. Given the relatively small sample of physicians, a meaningful multi-variate regression is difficult to estimate. While the fit in our regressions is poor, we are nonetheless able to identify statistically significant relationships between treatment modalities, physician characteristics, and top box score. We caution that our results do not imply a causative relationship but may be suggestive that one exists.

## **Statistical Analysis Physician Characteristics**

We investigate the relationship between physician characteristics, patient characteristics, and top box score. Three physician characteristics are observed: age, gender, and years in practice. However, since age and years in practice are highly correlated in our data set, we restrict attention to gender and years in practice. For this regression, we use binary variables on gender and years in practice (grouped into three buckets: 0-3, 4-9, and 10 or more years in practice). The coefficient on the GENDER="F" variable represents the effect on average top box score for a physician being female. The coefficients on the YEARSINPRACTICE variables show the effect from the physician being in a particular range of years in practice. Since the average top box score variable is a ratio 0 to 1, the magnitude of the coefficients are in the same units.

## **Statistical Analysis of Treatment Modalities**

We define treatment modality rate as the number of treatment actions per year divided by the number of patient encounters over the year. Regression analysis finds the correlation between the treatment modality rate and the top box score--that is, the percent of survey respondents giving a "9-10" response to the question of overall provider rating. Although providers likely vary in the distribution of complaints within their patient panels, due to the limitations of our dataset which includes only the chief complaint per encounter, we are unable to include this variable as a control in the regression. This omission potentially biases our results for treatment rates unrelated to diagnostic code since we cannot distinguish whether a higher treatment modality rate arises from the distribution of patient complaints in the provider's patient panel or from the provider's treatment decisions. This issue does not apply

when we restrict the sample to a particular chief complaint. Since we weight each provider equally in the regression, we restrict the sample to only those providers who had patient encounters greater than 300 per year with the goal of reducing low-significance data points.

## **Statistical Analysis Patient Compliance**

We obtained rates of colonoscopies and mammograms per provider. Unfortunately, these variables are not time-varying in our panel as we have only the rate for 2017. The independent variables are the top box score and a function of the number of eligible patients.

## **RESULTS**

### **Physician Characteristics**

Table 1 shows physician characteristics and top box scores.

(Insert Table 1)

As demonstrated in Table 1 female physicians who had been in practice for less than 10 years received lower top box scores in the overall doctor rating category on a scale of 0 to 10 when compared to male physicians and female physicians who have been in practice for 10 years or more. Female doctors in the early years of practice have top box scores which average 12.7% lower and female doctors in mid years of practice have scores which average 6.3% lower than male physicians who have been in practice for more than 10 years. Both male and female survey respondents gave lower top box scores to female doctors in the early and mid stages of career. We find lower scores given to female doctors in practice less than 10 years for all survey respondent age groups, with the notable exception of the 18-34 age group.

Table 2 demonstrates regression results for treatments provided for a specific diagnosis code defining the office visit, and results for visits not associated with a specific diagnosis code (i.e., patients coming in for an unrelated complaint but receiving refills on standing medications). The estimated regression coefficient is followed by the standard error, and p-value. For example, suppose a physician has a patient panel of 1000 and she writes, on average 200 prescriptions for stimulant medications for visits of any reason. She has a stimulant script rate of 0.2 per patient per year. Suppose she has a top box score of 90%. From the table, the highly significant coefficient for stimulant prescriptions is 0.658. If another physician with the same size patient panel writes 210 scripts per year, we would expect the other physician's top box score to be 90.658%. That is an average increase in top box score of 0.658 times a 1% increase in treatment rate.

There is a significant relationship in top box scores between prescribing narcotics for back pain but not for ordering of lumbar images. There does not appear to be a significant relationship between top box scores for antibiotic prescriptions and complaints of respiratory illness. For encounters involving complaints of depression, anxiety or fatigue there does not seem to be a significant relationship between top box scores and prescribing benzodiazepines. However, there does appear to be a significant relationship with prescribing stimulants. For “Any Reason Visits,” there is a significant relationship between top box scores for patients written prescriptions for benzodiazepines, narcotics and stimulants.

There is a significant positive relationship between top box score and compliance with mammography and colonoscopy screenings as demonstrated in table 3.

## DISCUSSION

This study examines factors influencing patient satisfaction. In our analysis, we see that female physicians who have been in practice for less than 10 years have lower top box scores when compared to male physicians who have been in practice for 10 or more years. This effect is not seen for male physicians who have been in practice for the same time frame or for female physicians who have been in practice for more than 10 years. This finding is consistent with findings of prior studies [8] [22] [28]. It is interesting to note that the exception to this finding is among female patients who are in the 18-34 age range, which likely correlates with the age range of physicians who have been in practice for less than 10 years. More research needs to be done to evaluate whether similar characteristics between patients and physicians correlate with patient satisfaction. Average top box scores for female physicians who have been in practice for more than 10 years do not show a statistically significant difference from scores for male physicians. From our data panel, we cannot determine whether this effect is due to the long-run matching process between patients and physicians--that is, patients who are not satisfied with the physician leave the physician's practice, creating a pool of satisfied patients in time-- or whether the effect is due to physicians who have been in practice for longer providing care in a way that patients perceive to be more satisfactory. Further study needs to be done to evaluate whether there is bias in the Press Ganey analysis of female doctors in the early stages of their primary care outpatient careers. Since physician gender, age or years in practice cannot be modified in most situations, the existence of the described effects poses important policy questions to using patient satisfaction as a metric for physician compensation.

Analysis of treatment modalities suggests that increasing rates of prescriptions for medications that are considered schedule II (benzodiazepines, narcotics and stimulants) is correlated with an increase in patient satisfaction scores. One limitation of the study is that Press Ganey scores are collected without knowing the reason for the patient visit. Therefore, a direct connection between prescribed medications and the Press Ganey score cannot be made. Chronic prescriptions, such as schedule II medications, may influence a patient's overall satisfaction with a provider when these prescriptions are refilled. Alternatively, higher satisfaction scores may be the result of physicians prescribing medications to suit a patient's perceived needs rather than actual medical needs.

It has been theorized that more satisfied patients have better outcomes in their health care. Based on this premise, we analyzed particular outcomes that are monitored by medical insurance companies as indicators of good patient care. Specifically, health systems are encouraged to document rates of mammograms and colonoscopies. Presumably, the more satisfied patients are more compliant with getting the recommended mammograms and colonoscopies. The data shows that physicians who had patients who are more satisfied are more likely to have a higher rate of compliance with mammograms and colonoscopies in their patient panel. Since we make an effort to control for the effect of higher satisfaction correlating with long-run matching (by proxy through the provider's patient panels size), this finding suggests that patients who are more satisfied with their care may be more likely to stay up to date with their health maintenance.

While this study has identified statistically significant relationships between patient satisfaction and (a) physician characteristics and (b) treatment modalities, more analysis is necessary. It is important to note the small sample size of the study and its restriction to primary care practices in a single suburban area limits the strength of the conclusions. Nonetheless, the results of the study point to two possible effects in using patient satisfaction scores to directly affect physician compensation. These effects should be worrying to policymakers, medical professionals, and society at large: One, tying compensation to patient satisfaction survey results may create adverse incentives for physicians in the practice of medicine, such as higher rates of prescriptions of schedule II medications and two, patient satisfaction scores may be related to physician characteristics such as age and gender, so basing reimbursement rates on satisfaction scores may unfairly penalize younger female physicians.

## REFERENCES

- [1] C. Darby, R. Hayes and P. Kletke, "Development and Evaluation of the CAHPS Hospital Survey," *Health Serv Res*, pp. 1973-1976, 2005.
- [2] R. Hays, I. Berman, M. Kanter, M. Hugh, R. Oglesby, K. CY, M. Cui and J. Brown, "Evaluation the Psychometric Properties of the CAHPS Patient-Centered Medical Home Survey," *Clinical Therapeutics*, vol. 36, no. 5, pp. 689-696, 2014.
- [3] R. Price, M. Elliot, A. Zaslavasky, R. Hays, W. Lehrma, L. Rybowski, S. Edgman-Levitan and P. Cleary, "Examining the Role of Patient Experience Surveys in Measuring Health Care Quality," *Med Care Res Rev*, vol. 71, no. 5, pp. 522-554, 2014.
- [4] D. Quigley, P. Mendel, Z. Predmore, C. AY and R. Hays, "Use of CAHPS Patient Exerience Survey Data as Part of a Patient-Centered Medical Home Quality Improvement Initiative," *Healthcare Leadership*, vol. 7, pp. 41-54, 2015.
- [5] J. Rao, M. Weinberger and K. Kroenke, "Visit-specific Expectations and Patient-centered Outcomes: a Literture Review," *Arch Fam Med*, vol. 172, no. 18, pp. 1377-1385, 2012.
- [6] A. Presson, C. Zhang, A. Abtahi, J. Kean, M. Hung and A. Tyser, "Psychometric Properties of the Press Ganey Outpatient Medical Practice Survey," *Health and Quality of Life Outcomes*, vol. 15, no. 32, pp. 1-7, 2017.
- [7] B. Graham, A. Green, M. James, J. Katz and M. Swiontkowski, "Measuring patient satisfaction in orthopaedic surgery," *Bone Joint Surge AM*, vol. 97, no. 1, pp. 80-84, 2015.
- [8] J. Chen, B. Zou and J. Shuster, "Relationship Between Patient Satisfaction and Physician Characteristics," *Journal ofPatient Experience*, vol. 4, no. 4, pp. 177-184, 2017.
- [9] G. GG, J. McCullough, R. Agarwal and J. AK, "A Changing Landscape of Physician Quality Reporting," *J Med Internet Res*, vol. 14, p. 38, 2012.
- [10] D. Hanauer, K. Zheng, D. Singer, A. Gebremariam and M. Davis, "Public Awareness, Perception, and Use of Online Physician Rating Sites," *JAMA*, vol. 311, pp. 734-735, 2014.

- [11] J. Pines, P. Penninti, S. Alfaraj, J. Carlson, O. Colfer, C. Corbit and V. A, "Measurement Under the Microscope: High Variability and Limited Construct Validity in Emergency Department Patient-Experience Scores," *Annals of Emergency Medicine*, pp. 1-10, 2017.
- [12] K. Bertakis and R. Azari, "Patient-Centered Care: The Influence of Patient and resident Physician Gender and Gender Concordance in Primary Care," *J Women's Health*, vol. 21, no. 3, pp. 326-333, 2012.
- [13] G. Sacks, L. EH, A. Dawes, R. MM, M. Maggard-Gibbons and Z. DS, "Relationship Between Hospital Performance on a Patient Satisfaction Survey and Surgical Quality," *JAMA Surg*, vol. 150, pp. 858-64, 2015.
- [14] S. Glickman, W. Boulding, M. Manary, R. Staelin, M. Roe and R. Wolosin, "Patient Satisfaction and its Relationship with Clinical Quality and Inpatient Mortality in Acute Myocardial Infarction.," *Circ Cardiovasc Qual Outcomes*, vol. 3, pp. 188-95, 2010.
- [15] W. Boulding, S. Glickman, M. Manary, K. Schulman and R. Staelin, "Relationship Between Patient Satisfaction with Inpatient Care and Hospital Readmission with 30 days," *Am J Manag Care*, vol. 17, pp. 41-48, 2011.
- [16] G. Kennedy, S. Tevis and K. Kent, "Is There a Relationship Between Patient Satisfaction and Favorable Outcomes?," *Ann Surg*, vol. 260, pp. 592-598, 2014.
- [17] J. Fenton, A. Jerant, K. Bertakis and P. Franks, "The Cost of Satisfaction: A National Study of Patient Satisfaction, Health Care Utilization, Expenditures, and Mortality," *Arch Intern Med*, vol. 172, no. 5, pp. 405-411, 2012.
- [18] J. Chang, R. Hays, P. Shekelle, C. MacLean, S. Dh and D. Reuben, "Patients' Global Ratings of Their Health Care Are Not Associated with the Technical Quality of Their Care," *Ann Intern Med*, vol. 144, pp. 665-72, 2006.
- [19] E. Fisher, D. Wennberg, T. Stukel, G. DJ, F. Lucas and E. Pinder, "The Implications of Regional Variations in Medicare Spending, Part 2: Health Outcomes and Satisfaction with Care," *Ann Intern Med*, vol. 138, pp. 288-298, 2003.
- [20] T. Sequist, E. Schneider, M. Anastario, E. Odigie, R. Marshall and W. Rogers, "Quality Monitoring of Physicians: Linking Patients' Experiences of Care to Clinical Quality and Outcomes," *J Gen Intern Med*, vol. 23, pp. 1784-1790, 2008.
- [21] C. Thiedke, "What Do We Really Know ABOUT Patient Satisfaction?," *Family Practice Management*, pp. 33-36, 2007.

- [22] K. Bertakis, P. Franks and R. Azari, "Effects of Physician Gender on Patient Satisfaction," *J Am Med Womens Association*, vol. 58, no. 2, pp. 69-75, 2003.
- [23] K. Derose, R. Hays, D. McCaffrey and D. Baker, "Does Physician Gender Affect Satisfaction of Men and Women Visiting the Emergency Department?," *J Gen Intern Med*, vol. 16, pp. 218-226, 2001.
- [24] J. Schmittziel, K. Grumbach, J. Selby and C. Quesenberry, "Effect of Physician and Patient Gender Concordance on Patient Satisfaction and Preventive Care Practices," *J Gen Inter Med*, vol. 15, pp. 761-769, 2000.
- [25] C. Weisman, D. Rich, J. Rogers, G. Crawford, C. Grayson and J. Henderson, "Gender and Patient Satisfaction with Primary Care: Tuning in to Women in Quality Measurement," *J Women's Health and Gender-Based Medicine*, vol. 9, no. 6, pp. 657-666, 2000.
- [26] R. Uhlmann, W. Carter and T. Inui, "Fulfillment of Patient Requests in a General Medicine Clinic," *Am J Public Health*, vol. 74, pp. 257-258, 1984.
- [27] R. Bell, R. Kravitz, D. Thom, E. Krupat and R. Azari, "Unmet Expectations for Care and the Patient-Physician Relationship," *J Gen Intern Med*, vol. 17, pp. 817-824, 2002.
- [28] C. Blanchard, M. Labrecque, J. Ruckdeschel and E. Banchar, "Physician Behaviors, Patient Perceptions and Patient Characteristics as Predictors of Satisfaction of Hospitalized Adult Cancer Patients," *Cancer*, vol. 65, pp. 186-192, 1990.
- [29] D. Brody, S. Miller, C. Lerman, S. DG, C. Lazaro and M. Blum, "The Relationship Between Patients' Satisfaction with Their Physicians and Perceptions About Interventions They Desired and Received," *Medical Care*, vol. 27, no. 11, pp. 1027-1035, 1989.
- [30] K. Otani, B. Water, K. Faulkner, S. Boslaugh, T. Burroughs and W. Dunagan, "Patient Satisfaction: Focusing on Excellent," *J Healthcare Mangement*, vol. 54, no. 2, pp. 93-103, 2009.
- [31] B. Peck, P. Ubel, D. Roter, S. Goold, D. Asche, A. Jeffreys, S. Grambow and J. Tulsy, "Do Unmet Expectations for Specific Tests, Referrals, and New Medications Reduce Patient Satisfaction?," *J Gen Inter Med*, vol. 19, pp. 1080-1087, 2004.
- [32] A. Zgierska, D. Rabago and M. Miller, "Impact of Patient Satisfaction Ratings on Physicians and Clinical Care," *Patient Preference and Adherence*, vol. 8, pp. 437-446, 2014.
- [33] F. Anagnostopoulos, E. Liolios, G. Persefonis, J. Slater, K. Kafetsios and D. Niakis, "Physician Burnout and Patient Satisfaction with Consultation in Primary Health Care Settings: Evidence of Relationships from a One-With Many Design," *J Clin Psych in Medical Settings*, vol. 19, no. 4, pp. 401-410, 2012.

[34] T. Shaafelt, S. Boone, L. Tan, L. Dyrbye, W. Sotile, D. Satale, C. West, J. Sloan and M. Oreskovich, "Burnout and Satisfaction with Work-Life Balance Among US Physicians Relative to the General US Population," *Arch Intern Med*, vol. 172, no. 18, pp. 1377-1385, 2012.

[35] K. Falkenberg, "Why Rating Your Doctor Is Bad For Your Health," *Forbes*, 2013.

**TABLES**

**Table 1: Physician Characteristics and Top Box Scores**

<i>Physician type</i>		<i>Patient gender subgroup responding</i>			
		<i>ALL</i>	<i>FEMALE</i>	<i>MALE</i>	
FEMALE, EARLY		-0.1270 (0.0294) p=0.0000	-0.1429 (0.0340) p=0.0000	-0.0665 (0.0302) p=0.0284	
FEMALE, MID		-0.0630 (0.0202) p=0.0020	-0.0617 (0.0233) p=0.0086	-0.0424 (0.0210) p=0.0441	
FEMALE, LATER		0.0029 (0.0142) p=0.8402	0.0025 (0.0164) p=0.8788	0.0253 (0.0146) p=0.0844	
MALE, EARLY		-0.0249 (0.0284) p=0.3818	-0.0116 (0.0328) p=0.7245	-0.0300 (0.0292) p=0.3050	
MALE, MID		-0.0114 (0.0221) p=0.6073	0.0038 (0.0256) p=0.8806	-0.0169 (0.0227) p=0.4589	
<i>FEMALE, EARLY coefficient by Patient age subgroup responding</i>					
0-17	18-34	35-49	50-64	65-79	80+
-0.3090 (0.1172) p=0.0098	0.0346 (0.0754) p=0.6471	-0.1674 (0.0559) p=0.0030	-0.1308 (0.0319) p=0.0001	-0.1013 (0.0306) p=0.0011	-0.0190 (0.0671) p=0.7779

Predicting top-box score from demographic variables

Filter to doctors with APPOINTMENTS>300 (to reduce noise from small samples)

YEARS\_IN\_PRACTICE < 4 is called EARLY

YEARS\_IN\_PRACTICE BETWEEN 4 and 9 is called MID

YEARS\_IN\_PRACTICE>10 is called LATER

Each set is for a given patient population responses to P-G survey.

For age group results, we show only the coefficient for FEMALE, EARLY

**Table 2: Regression Results for Treatments by Searched and Unrelated Diagnosis Code.**

Treatment (rate)	Coefficient (standard error) and pvalue
<b>Backpain</b>	
Lumbar Images/Total Encounters	0.0752 (0.0962) p=0.4338
Narcotic Scripts/Total Encounters	0.1820 (0.0836) p=0.0303
<b>Depression/Anxiety/Fatigue</b>	
Benzodiazepine Scripts/Total Encounters	0.0677 (0.1394) p=0.6274
Stimulant Scripts/Total Encounters	0.2730 (0.2251) p=0.0410
<b>Respiratory Illness</b>	
Antibiotics/Total Encounters	0.3994 (0.1947) p=0.6274
<b>Any Reason Visit</b>	
Benzodiazepine Scripts/Appointments	0.5714 (0.2609) p=0.0292
Narcotics Scripts/Appointments	0.4983 (0.2120) p=0.0194
Stimulant Scripts/Appointments	0.6581 (0.2307) p=0.0046
Antibiotics/Appointments	0.3673 (0.1928) p= 0.0576

Dependent variable is percent of 9-10 scores on question 'Overall Doctor Rating 0-10'

Appointments is kept appointments for the year; filter to APPOINTMENTS>300

Encounters is # encounters with diagnosis code, filter to TOTALENCONTAINERS>10

**Table 3: Compliance Rate for Mammogram and Colonoscopy and Press Ganey Score**

Compliance (rate); Patient subgroup responding	Variable	Coefficient
<b>COLONOSCOPY</b>		
ALL	HIGH_PERCENTRESPONSE	0.2049 (0.0527) p=0.0001
	COLON_NUMELIGIBLE	-0.0011 (0.0002) p=0.0000
	COLON_NUMELIGIBLE^2	1.437E-06 (3.327E-07) p=0.0000
	COLON_NUMELIGIBLE^3	-6.307E-10 (1.481E-10) p=0.0000
	LOG(COLON_NUMELIGIBLE)	0.1117 (0.0136) p=0.0000
<b>MAMMOGRAM</b>		
ALL, FEMALE	HIGH_PERCENTRESPONSE	0.2114 (0.0493) p=0.0000
	BREAST_NUMELIGIBLE	-0.0020 (0.0005) p=0.0000
	BREAST_NUMELIGIBLE^2	4.678E-06 (1.285E-06) p=0.0003
	BREAST_NUMELIGIBLE^3	-3.550E-09 (1.106E-09) p=0.0015
	LOG(BREAST_NUMELIGIBLE)	0.1271 (0.0158) p=0.0000

Dependent variable is percent eligible patients who are "compliant". Note that this is NOT a time-varying variable; we only have the last number. Independent variables are the top box score (that is, percent of 9-10 scores on question 'Overall Doctor Rating 0-10') and some functions of the number eligible patients. We include the functions of number of eligible patients since we know that top box score is correlated with length of practice, so the size of (relevant) patient panel controls for that effect. Appointments is kept appointments for the year; filter to APPOINTMENTS>300 to restrict to active doctors.

