

# Patient Satisfaction and Physician Productivity: Complementary or Mutually Exclusive?

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Motivating physicians to increase productivity and maximize patient satisfaction may result in conflicted behavior, raising questions about whether one must be sacrificed for the other. To determine if high satisfaction (measured by Press Ganey patient satisfaction survey) can be achieved while maintaining high productivity (measured in McGladrey relative value units, MRVU), longitudinal data collected from January 2002 to July 2004 were modeled using repeated measures regression. A total of 136 000 patient-completed satisfaction questionnaires evaluating 417 physicians were collected for analysis. Patient confidence (positively correlated;  $P = .001$ ) and physician/patient time (inversely correlated;  $P = .001$ ) were associated with higher physician productivity. Increases in MRVU were associated with decreases in patient perceptions of time with the physician ( $P = .003$ ). The relationships between patient satisfaction and physician productivity were relatively small, suggesting that they are not necessarily incompatible and that both

can be improved simultaneously. (*Am J Med Qual* 2009;24:498-504)

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Satisfaction with quality of care is important to patients, policy makers, physicians, and payers<sup>1-7</sup> and is a motivation behind the development of physician ratings.<sup>8</sup> Physicians will be required to respond as patient satisfaction ratings become commonplace, but they will be challenged with constraints that force a balance between time that can be spent with patients and financial pressures to deliver more care in the same time. These pressures often will reduce the time available for a given patient.<sup>9</sup> Practice style, patient management, and communication skills are likely to be important to maintaining patient satisfaction and the viability of ambulatory practices.

Evidence suggests that patient satisfaction is directly related to the amount of time that a physician spends with him or her.<sup>9-12</sup> An overall satisfying experience, however, may not be uniformly tied to this single dimension.<sup>12</sup> Physicians and practice managers are faced with the dilemma of attempting to maximize 2 seemingly conflicting factors, raising questions as to whether one must be sacrificed for the other.

We examined whether physician productivity and patient satisfaction were in conflict, using a longitudinal database available for a large primary and multispecialty practice from the Geisinger Clinic (GC) physician population. The primary objective of this study was to determine if high physician

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productivity and increasing productivity are associated with lower patient satisfaction scores and decreasing patient satisfaction scores.

## METHODS

The GC provides primary and specialty care to residents of central and northeastern Pennsylvania at 41 community practice sites and 2 large medical centers. GC employs more than 600 physicians, 33% of whom are primary care providers. Since 2002, satisfaction has been measured continuously using a survey that is mailed to patients. In addition, physician productivity is measured daily in relative value units (RVU). An RVU reflects the relative value of the physician's work for a particular procedure, in terms of time and intensity of effort, and compares it with the value of work required for other procedures. We examined the relation between these 2 measures among 417 physicians at cross section (ie, when both items are measured at the same point in time) and longitudinally (ie, when changes to one item are related to changes in the other) over a 30-month period. The study was reviewed and approved by the Geisinger Health System Institutional Review Board.

### Data Collection

Patient satisfaction is measured continuously. Since January 2002, a Press Ganey satisfaction questionnaire is mailed to a random sample of 9 patients from each physician each week. The Press Ganey survey was found to be psychometrically sound across multiple tests of validity and reliability.<sup>2</sup> Patients are selected randomly from among those who had an outpatient encounter with the physician in the previous 5 days. Patients return completed questionnaires in an enclosed stamped self-addressed envelope. Questionnaires are completed anonymously, although the patient's physician is identified. The overall average response rate is between 30% and 35%.

The Press Ganey questionnaires are sent with a letter referencing the patient's recent visit. In addition to the date of the visit, the questionnaire asks for the patient's sex, age, and length of time in the waiting room. The information on sex is missing in 12% of the surveys, age information is missing in 12% of the surveys, and length of time in the waiting room is missing in 20% of the surveys. The

patient satisfaction questions assess access to care, experiences during the visit, satisfaction with the care provider, personal issues, and an overall assessment of the care provided. For the analysis described herein, we used data from 10 questions relevant to satisfaction with care provider during the recent encounter (Table 1). Question response options are in Likert format: very poor, poor, fair, good, and very good.

Productivity for all physicians within the GC is measured using a work RVU.<sup>13</sup> The RVU is a calculated numeric value based on the number of services provided and the corresponding relative value of each service (which is dependent on time to complete the service, the skill required, the level of training required, and expenses associated with the service). This allows for a comparison of productivity between physicians responsible for similar procedures. Furthermore, to allow for comparison across specialty, the McGladrey RVU percentile ranking (MRVU) is calculated. MRVU is a national benchmarking of physician productivity among 38 multispecialty groups. The MRVU is a score between 0 (*least productive*) and 100 (*most productive*) that provides a ranking within each specialty. The resulting MRVU value may be used for comparison within and between specialties. For this study, MRVU was calculated for each physician during each 6-month period from January 2002 through June 2004.

Satisfaction and RVU scores were derived for sequential 6-month intervals (ie, January 1 to June 30 and July 1 to December 31), corresponding to the total time of service for each physician. In addition, data were extracted on physician age, sex, length of employment, and clinical department.

Physicians were eligible for inclusion in the analysis if at least 10 questionnaires were returned for any one 6-month interval for which comparable MRVU data were available (N = 142 369 eligible surveys). Questionnaire data were not used if 50% or more of the required items did not have a response (n = 372 surveys, <1%). Clinical departments with 5 or fewer physicians were excluded from consideration (n = 5997 surveys, 4%). This left 136 000 surveys for analysis.

### Statistical Analysis

Our primary hypothesis was that patient satisfaction would be inversely related to physician

**Table 1**  
Distribution of Responses to Questions Pertaining to Patient Satisfaction With the Physician Encounter Using the Press Ganey Survey (N = 136 000 Patient Responses)

Question	Very Poor	Poor	Fair	Good	Very Good
Q1 Friendliness/courtesy of the care provider	262 (<1%)	342 (<1%)	1810 (1%)	23 263 (17%)	110 323 (81%)
Q2 Explanations the care provider gave you about your problem or condition	449 (<1%)	805 (<1%)	3875 (3%)	30 845 (23%)	100 026 (74%)
Q3 Concern the care provider showed for your questions or worries	529 (<1%)	827 (<1%)	4025 (3%)	30 741 (23%)	99 878 (73%)
Q4 Care provider's efforts to include you in decisions about your treatment	461 (<1%)	814 (<1%)	4283 (3%)	32 507 (24%)	97 935 (72%)
Q5 Information the care provider gave you about medications	461 (<1%)	756 (<1%)	4045 (3%)	30 093 (22%)	100 645 (74%)
Q6 Instructions the care provider gave you about follow-up care	517 (<1%)	818 (<1%)	3900 (3%)	31 240 (23%)	99 525 (73%)
Q7 Degree to which care provider talked with you using words you could understand	329 (<1%)	410 (<1%)	2755 (2%)	28 485 (21%)	104 021 (76%)
Q8 Amount of time the care provider spent with you	599 (<1%)	1006 (<1%)	6303 (5%)	35 291 (26%)	92 801 (68%)
Q9 Your confidence in this care provider	717 (<1%)	722 (<1%)	3427 (3%)	24 633 (18%)	106 501 (78%)
Q10 Likelihood of your recommending this care provider to others	1111 (<1%)	909 (<1%)	3388 (3%)	23 898 (18%)	106 694 (78%)

productivity. Before analyses were completed, missing values for the patient satisfaction survey were imputed using the median response value for each question (3.3% of all questions were missing). Sensitivity analyses revealed that the choice of imputation method did not change the result. Factor analysis (SAS PROC FACTOR; SAS Institute Inc, Cary, NC) was completed to determine if the 10 satisfaction questions could be condensed into a smaller number of factors. Varimax rotation was performed to offer the most adequate interpretation of the factor-based scores. A total of 4 factors were identified with an eigenvalue  $\geq 1$ . Factor scores (standardized to mean = 0 and standard deviation [SD] = 1) were calculated for each survey response and considered for outcome analysis.

A repeated-measures mixed-regression model was used to determine if the individual factor-based scores were related to physician productivity. The individual survey responses were treated as the unit of analysis, nested within each physician as repeated measures. In this framework, the physician was treated as a random effect. MRVU was included in the model as a fixed effect. Univariate and multivariate models were run that controlled for patient age at the time of questionnaire completion (<50 years, 50+ years, unknown), patient sex (M, F, unknown), patient wait time (time spent in the waiting area before appointment and time spent in the exam room waiting for physician to begin appointment; 0-10 minutes, 11-20

minutes, 21-30 minutes, 31-60 minutes, 61-120 minutes, 120+ minutes, unknown), physician age at the time of questionnaire completion (continuous measure), physician sex (M, F), length of employment at Geisinger (continuous measure), and clinical department where the patient encounter took place (14 departments identified). Continuous values were categorized into ordinal groupings to minimize the influence of outliers and to avoid removal of surveys with unknown values for patient age, patient sex, and waiting room times (categories are described above). A separate analysis was completed for the subset of primary care physicians in community practice sites, as this was the largest group of physicians for whom the practice environment was somewhat homogeneous. Finally, we also completed longitudinal analysis to determine if changes in patient satisfaction scores were related to change in MRVU. This analysis was conducted using the mixed regression model as described above.

SAS version 8.1 (SAS Institute Inc) was used for all data manipulations and analyses. All tests were 2-tailed and *P* values  $\leq .05$  were considered significant.

## RESULTS

Descriptive statistics on physicians and survey responses are presented first, followed by a summary of the factor analysis, regression models for

**Table 2**  
Results of Factor Analysis on Questions Pertaining to Patient Satisfaction With the Physician Encounter Using the Press Ganey Survey

Question	Factor 1 <sup>a</sup>	Factor 2 <sup>b</sup>	Factor 3 <sup>c</sup>	Factor 4 <sup>d</sup>
Q1 Friendliness/courtesy of the care provider	<b>.62</b>	.45	.24	.23
Q2 Explanations the care provider gave you about your problem or condition	<b>.74</b>	.36	.34	.23
Q3 Concern the care provider showed for your questions or worries	<b>.74</b>	.37	.33	.27
Q4 Care provider's efforts to include you in decisions about your treatment	<b>.70</b>	.28	.44	.24
Q5 Information the care provider gave you about medications	.30	.24	<b>.84</b>	.19
Q6 Instructions the care provider gave you about follow-up care	.37	.28	<b>.76</b>	.22
Q7 Degree to which care provider talked with you using words you could understand	<b>.57</b>	.33	.37	.39
Q8 Amount of time the care provider spent with you	.36	.32	.29	<b>.82</b>
Q9 Your confidence in this care provider	.41	<b>.77</b>	.30	.27
Q10 Likelihood of your recommending this care provider to others	.37	<b>.82</b>	.29	.23
Percentage of variability explained	29%	22%	22%	9%

Note: The bold values represent the dominant factor for each question.

<sup>a</sup>Factor 1 = Provider presentation.

<sup>b</sup>Factor 2 = Patient confidence.

<sup>c</sup>Factor 3 = Patient education.

<sup>d</sup>Factor 4 = Physician/patient time.

the cross-sectional relation between patient satisfaction scores and MRVU, and regression models for the longitudinal relation between patient satisfaction scores and MRVU.

**Characteristics of Physicians, Respondents, and Survey Responses**

A total of 417 physicians qualified for inclusion in the study. The mean and median age was 47 years (SD = 9; range = 29-78); 76% were male. Physicians were employed with GC for an average of 8 years (median = 6.5 years). Primary care physicians at community practice sites (181) were the largest source of physicians followed in order by the specialties of pediatrics (34), cardiology (31), obstetrics/gynecology (31), and surgery (29). The mean MRVU was 63% (median = 66%), indicating that the average physician in the study ranked at the 63rd percentile among their specialty group. The average MRVU was 60% in 2002 and 64% in 2004.

Over the 30-month period, 136 000 questionnaires qualified for inclusion in the study (mean = 326 per physician). About half of the questionnaires were from patient encounters originating at a community clinic site and the other half originated at one of the specialty clinics in 1 of 2 medical centers (41% came from Geisinger Medical Center and 9% came from Geisinger Wyoming Valley Medical Center). The mean age of the respondents was 55 and the median age was 59 years (SD = 22; range = 1-99); 42% were male.

A vast majority of responses to the questions pertaining to satisfaction with the physician encounter were “very good” (ranging from 68% to 81%; Table 1) with <1% considered “poor” or “very poor.”

**Factor Analysis**

Factor analysis of patient satisfaction data was used to reduce the 10 questions to a smaller number of outcomes for regression modeling. As previously noted, 4 independent factors were identified (Table 2). Provider presentation was the dominant factor (29% variability), followed in order by patient confidence in the provider (22%), patient education (22%), and physician/patient time (4%). The resulting factor scores were standardized to a mean of 0 and a standard deviation of 1.

**Regression Modeling of RVU and Satisfaction**

In univariate repeated-measures, mixed-regression modeling (Table 3), increasing patient confidence was associated with increasing MRVU ( $P = .0001$ ). In contrast, decreasing physician/patient time was associated with increasing MRVU ( $P = .0001$ ). Provider presentation was not associated with MRVU ( $P = .37$ ), and although MRVU increased with increasing patient education, the association was not statistically significant ( $P = .097$ ).

In multivariate mixed-regression modeling (Table 3), MRVU remained a significant positive

**Table 3**  
Cross-Sectional Analysis<sup>a</sup>

	Crude			Adjusted		
	Effect Size	SE	P Value	Effect Size	SE	P Value
All physicians (n = 136 000 patient respondents on 417 physicians)						
Provider presentation	.007	.008	.37	.003	.008	.70
Patient confidence	.041	.008	.0001	.024	.007	.0012
Patient education	.010	.006	.097	.004	.006	.46
Physician/patient time	-.032	.008	.0001	-.028	.007	.0002
Primary care physicians (n = 63 161 patient respondents on 181 physicians)						
Provider presentation	.017	.012	.14	.008	.012	.52
Patient confidence	.053	.013	.0001	.034	.012	.0040
Patient education	.015	.009	.092	.003	.010	.74
Physician/patient time	-.22	.010	.024	-.026	.011	.012

<sup>a</sup>Unadjusted and adjusted effect sizes of a 25% increase in McGladrey relative value unit percentile ranking in predicting satisfaction scores for all physicians and for the subset of primary care physicians. The adjusted effect size estimates were controlled for patient age, patient sex, physician age, physician sex, physician length of employment, waiting room times, year of service, and provider type (primary care or specialty department).

predictor of patient confidence ( $P = .0012$ ) and a negative predictor of physician/patient time ( $P = .0002$ ). In particular, a 25% absolute increase in MRVU (eg, an increase from a 50% McGladrey percentile ranking to a 75% McGladrey percentile ranking) was associated with a 0.024 SD increase in patient confidence and a 0.028 SD decrease in physician/patient time (both of which correspond to approximately 1/150th of the range of possible values). MRVU was not a significant predictor of provider presentation or patient education.

The above analysis was repeated for the subset of primary care physicians in community practice (181 physicians with 63 161 surveys returned) for whom sufficient longitudinal data were available (Table 3). Further multivariate mixed regression analysis resulted in the same factors being significantly related to MRVU.

### Longitudinal Analyses

In mixed-model regression, mean changes in overall satisfaction and the 4 derived factor scores were examined in relation to mean changes in MRVUs across each of 5 successive 6-month periods beginning in January 2002. Increases in mean MRVU were related to decreases in patient satisfaction with physician/patient time ( $P = .003$ ; Table 4). In particular, a 25% absolute increase in MRVU was associated with a 0.022 SD decrease in patient satisfaction with physician/patient time. Although small, this significant relationship was

**Table 4**  
Longitudinal Analysis<sup>a</sup>

All Physicians (405 Physicians With 1117 6-Month Time Intervals)			
	Effect Size	SE	P Value
Provider presentation	.0071	.0071	.32
Patient confidence	.0044	.0079	.58
Patient education	.0056	.0072	.44
Physician/patient time	-.022	.0073	.0026

<sup>a</sup>Effect sizes of a 25% change in McGladrey relative value unit percentile ranking in predicting change in satisfaction scores for all physicians.

consistent with the cross-sectional results described above and accumulates with time (ie, each 6-month interval) as a provider becomes more or less productive. Changes in MRVU were not related to changes in overall satisfaction scores ( $P = .41$ ), provider presentation ( $P = .32$ ), patient confidence ( $P = .58$ ), or patient education ( $P = .44$ ).

### DISCUSSION

The impact of physician productivity on influencing patient satisfaction appears to be relatively small, as patient satisfaction depends on numerous other factors (eg, other physician traits, patient traits, waiting room times). We consider these findings as well as limitations to the study.

Productivity was positively related to a patient having more confidence in the provider and a greater likelihood of recommending the care provider to others. However, patient satisfaction is

inherently multidimensional and it is unlikely that productivity of the physician is mediating this effect. Research on physician productivity has shown a number of factors influencing high productivity, including use of physician assistants and nurse practitioners,<sup>14</sup> number of exam rooms per provider,<sup>15</sup> patient mix (multiple problems associated with longer visits),<sup>16</sup> and personal characteristics of the physician.<sup>17,18</sup>

While recognizing that the questionnaire does not cover all domains of patient satisfaction, we used factor analysis to identify dimensions/components of patient satisfaction in the Press Ganey survey. For example, patients' ratings of the time their physician spends with them during a visit were inversely associated with productivity. We found there was no association between productivity and items that reflect physician communication (ie, friendliness, explanations of problems, concern for worries, mutual decision making, using understandable words), suggesting that variables other than productivity affect patient perceptions of those relationship qualities. Though not presented in this article, patient age and sex and provider specialty were associated with higher patient satisfaction with time spent with the physician. Provider MRVU, waiting room time, and exam room time were negatively associated with patient satisfaction with the amount of time they had with their physicians.

The finding of little or no clinically meaningful association between physician productivity and patient satisfaction is consistent with the preponderance of previous research that suggests that multiple factors (eg, specialty, physician and patient demographics, physician and patient behavior during the visit)—and not solely physician productivity or time spent—influence patient satisfaction, trust, or a sense of having reached “common ground.”<sup>7,19-21</sup> For example, patient expectations and problem severity also have been shown to moderate patients' satisfaction with time spent.<sup>12</sup> Patient perceptions depend on the context of their health care, what they need and want at the moment, as well as other interactions during an episode of care.<sup>7</sup> Similarly, analyses of the large Press Ganey database of satisfaction surveys show that while perceived time spent with the physician contributes to the decision to recommend a care provider, other interaction qualities, such as confidence and concerns for questions/worries, contribute more to the decision.<sup>2,4</sup> Other studies confirm

the importance of physician–patient demographic match and the duration of a physician's practice in influencing patient experience.<sup>6,22</sup>

The results of this study indicate that patient satisfaction and productivity do not have to be sacrificed for each other; both can be improved simultaneously. Though significant relationships were found, they were in opposite directions and were quite weak. Overall, productivity played a small role in predicting satisfaction. Patients can have a positive experience during an outpatient encounter in parallel with elevated physician productivity. Waiting room time may be considerably more important to patient satisfaction, a factor that is largely controlled by the practice manager. Waiting times may well color the patient's perception of the physician visit.<sup>23</sup> For our study (data not shown) and others, perceived exam room time was negatively related to patient ratings of confidence in their doctors and negatively related to willingness to recommend them to others.<sup>7</sup> This highlights the importance of making the patient's journey through the clinic as prompt as possible and of giving clear expectations about waiting times in the waiting room and exam room.

To accurately interpret patient satisfaction, physicians should be compared with their own specialty because of the wide discrepancies between specialties in patient satisfaction mean scores. Likewise, for our study, patient satisfaction was related to patient age and patient sex (data not shown). It may be especially important for health systems to incorporate awareness of demographic matching in relationship training. Physicians and managers should be aware of the positive association between length of employment and patient satisfaction.<sup>5</sup> Length of employment may be associated with patient satisfaction because physician relationship skills improve and evolve over time, and relationships evolve over time. However, it also may be related to patient satisfaction because it reflects attrition of dissatisfied patients and reduction in cognitive dissonance of those who remain loyal (“I'm still with this doctor so I must like her”).

## Limitations

This study is an observational study in 1 health system, using patient reports of their satisfaction and estimates of waiting times. The productivity and satisfaction measures may not cover all domains of interest or all ranges of values. The response rate

for satisfaction surveys for this study was similar to that of other institutions that use the Press Ganey patient satisfaction survey. However, a response rate of 30% to 35% may lead to selection bias and may limit the generalizability of the results. Sample sizes of patient satisfaction surveys per physician vary. Though the national reference Press Ganey database is extensive, the predictive validity of the Press Ganey patient satisfaction measure for patient outcomes has not been established. Although a subgroup analysis within this study showed that primary care physicians had a relationship consistent with the entire study population, it is unclear if the same finding holds among specialty subgroups. Finally, the Geisinger population is largely Caucasian and 40% rural, so results may not generalize to other populations.

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