

Health Information Technology and Physician Career Satisfaction

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Abstract

Purpose: Health information technology (HIT) and physician career satisfaction are associated with higher-quality medical care. However, the link between HIT and physician career satisfaction, which could potentially reduce provider burnout and attrition, has not been fully examined. This study uses a nationally representative survey to assess the association between key forms of HIT and career satisfaction among primary care physicians (PCPs) and specialty physicians.

Methods: We performed a retrospective, cross-sectional analysis of physician career satisfaction using the Community Tracking Study Physician Survey, 2004–2005. Nine specific types of HIT as well as the overall adoption of HIT in the practice were examined using multivariate logistic regression.

Results: Physicians who used five to six (odds ratio [OR] = 1.46) or seven to nine (OR = 1.47) types of HIT were more likely than physicians who used zero to two types of HIT to be “very satisfied” with their careers. Information technology usages for communicating with other physicians (OR = 1.31) and e-mailing patients (OR = 1.35) were positively associated with career satisfaction. PCPs who used technology to write prescriptions were less likely to report career satisfaction (OR = 0.67), while specialists who wrote notes using technology were less likely to report career satisfaction (OR = 0.75).

Conclusions: Using more information technology was the strongest positive predictor of physicians being very satisfied with their careers. Toward that end, healthcare organizations working in conjunction with providers should consider exploring ways to integrate various forms of HIT into practice.

Introduction

Health information technology (HIT) has gained increased importance since the 2001 Institute of Medicine report *Crossing the Quality Chasm*, which emphasized HIT as a means for improving the effectiveness and timeliness of healthcare delivery, patient safety, and patient-centered care.¹ The literature is replete with examples that support the importance of HIT in

healthcare.²⁻¹¹ Medication errors are a leading source of harm in the U.S. healthcare system, and HIT is associated with significant reductions in adverse drug events and medication errors.¹²⁻¹⁶ The implementation of HIT in various healthcare settings has reduced waste and inefficiency in services and facilitated physician adherence to treatment protocols, an important area for quality improvement.¹⁷⁻²³ In recognition of the importance of HIT in quality improvement, the Obama administration announced \$1.2 billion in federal grants for electronic medical records in physician offices and hospitals.²⁴

However, physician career satisfaction also has important implications for the delivery of quality medical care.²⁵⁻³⁰ Physicians who are satisfied with their careers provide better overall healthcare compared to dissatisfied physicians, and satisfied physicians are more likely to stay in their practice, enhancing patient continuity, which is an important component of healthcare quality.³¹⁻³⁷ In contrast, dissatisfied physicians are more likely to leave the profession, and studies show almost 20 percent of physicians are dissatisfied with their career in medicine.³⁸⁻⁴⁰ Landon, Reschovsky, and Blumenthal (2003) found that physician job satisfaction is not improving.⁴¹

Some of the decline in physician career satisfaction is related to inadequacy of resources as well as decreased physician autonomy and time constraints attributed to managed care.⁴²⁻⁴⁶ Primary healthcare providers have been particularly impacted by time demands.⁴⁷⁻⁵¹ In addition, some view primary care as an unappealing specialty because of perceived demands by the patient and insurer that sometimes compete and create a lack of healthcare coordination.⁵²⁻⁵⁴ Physicians who report not being able to spend enough time with patients and have challenges following clinical guidelines are more likely to be dissatisfied with their careers.^{55, 56}

HIT could impact physician career satisfaction by reducing administrative burdens and improving access to clinical information and patient records, thereby allowing physicians to spend more time with patients and improving quality of care.⁵⁷ While some have examined physician assessments of HIT and its impact on quality of care, less attention has been focused on the role of HIT in improving the quality of a physician's career, which has direct implications for healthcare delivery. One study found no significant association between HIT integration and physician career satisfaction.⁵⁸ That study, however, focused exclusively on physicians in academic medical centers, who have access to different resources than community physicians. Our study is the first to examine the impact of HIT on physician career satisfaction using a nationally representative sample.

Methods

Data

Data for this study came from the fourth round of the Community Tracking Study (CTS) Physician Survey, 2004–2005. This telephone survey, conducted by the Center for Studying Health System Change, used a complex sampling design of 60 communities (51 metropolitan and 9 nonmetropolitan areas) randomly selected to yield a nationally representative sample of physicians in the United States. Nonfederal physicians who worked at least 20 hours per week were identified from the November 2003 master files of the American Medical Association and the American Osteopathic Association. Physicians who had not completed their training or who were only temporarily licensed to practice in the United States were excluded. Proxy respondents

were not permitted. The weighted response rate among eligible participants was 52.4 percent, yielding a sample of 6,628 physicians.

Some respondents had missing data for the dependent variables or key control variables, so the sample for analysis was 5,198 physicians. Since primary care physicians and specialty physicians have historically reported different levels of career satisfaction, this study also examined whether HIT plays a different role for primary care physicians ($n = 3016$) and specialists ($n = 2182$).⁵⁹

Main Outcome Variable

The dependent variable was constructed from the following question: “Thinking very generally about your satisfaction with your overall career in medicine, would you say that you are currently: very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied, neither satisfied nor dissatisfied.” If the physician answered “very satisfied,” then the dependent variable equaled 1. Physicians who responded “don’t know” or “refuse to answer” were excluded. All other responses were coded as 0.

Independent Variables

The CTS included detailed information about the use of HIT. Physicians were asked to answer “yes” or “no” to the following questions:

“In your practice, are computers or other forms of information technology used . . .

- to obtain information about treatment alternatives or recommended guidelines?”
- to obtain information on potential patient drug interactions with other drugs, allergies, and/or patient conditions?”
- to obtain information on formularies?”
- for clinical data and image exchanges with other physicians?”
- for clinical data and image exchanges with hospitals and laboratories?”
- to generate reminders for you about preventive services?”
- to access patient notes, medication lists, or problem lists?”
- to write prescriptions?”
- to communicate about clinical issues with patients by e-mail?”

One set of models included nine binary measures of HIT that stemmed from each question. This approach allowed us to directly examine which types of HIT are associated with physician career satisfaction. Another set of models included an ordinal measure of HIT use. This measure was constructed by adding the number of types of HIT that were used by each physician. The range for this measure was 0 to 9. This index was then divided into quartiles. Physicians who adopted fewer than three types of HIT were classified as “very low” users. Physicians who used three or four types of HIT were classified as “low users,” and physicians who reported five or six types of HIT were classified as “high users” of HIT. Physicians who used seven or more types of HIT were classified as “very high” users of HIT. These four categories of HIT adoption were

used to construct an ordinal measure of HIT use. This measure allowed us to explore whether the amount of HIT used was associated with physician satisfaction.

Three categories of control variables that have been previously found to influence physician career satisfaction were also included in the analysis. Physician practice characteristics included the size of the practice, percent of revenue from Medicaid patients, and a self-reported assessment of the competition faced by the practice in the local market. The patient mix was measured with the percent of patients that had a language barrier, the percent of patients that were Asian, the percent of patients that were black, the percent of patients that were Hispanic, and the percent of patients with a chronic illness. Physician characteristics included gender, race, age, whether the physician was foreign trained, board certification, and specialty.

Statistical Analysis

Logistic regression was used to examine the association between the binary dependent measure of career satisfaction and the use of HIT. All analyses were conducted with SUDAAN 9.0 statistical software, which has procedures to adjust the standard errors for the complex sampling design of the CTS.⁶⁰

Results

Initial characteristics of physicians who were included and physicians who were not included due to missing data were compared with a *t*-test. The respondents with missing data (1430) were similar to those included in the analyses regarding control and outcome variables such as physician satisfaction with careers, type of HIT used, number of HIT used, practice size, physician type, gender, age, and race of physicians. Most physicians reported satisfaction with their careers (Figure 1). About 40 percent of physicians were “very satisfied,” while another 40 percent were “somewhat satisfied.” Only 4 percent of physicians were “very dissatisfied” with their careers.

Figure 2 shows the use of the nine types of HIT by all physicians, primary care physicians, and specialty physicians. Physicians mostly used technology to communicate with hospitals and laboratories, obtain information about treatment alternatives or recommended guidelines, and obtain information on formularies. Physicians were least likely to use technology to write prescriptions, e-mail patients, and generate reminders for preventive services. Patterns of use were different between PCPs and specialists. For example, 54 percent of specialists used HIT for clinical data and image exchanges with other physicians while only 40 percent of PCPs used HIT for this purpose. Specialists (51 percent) were also more likely than PCPs (40 percent) to use HIT to access patient notes. PCPs were more likely than specialists to use HIT to generate reminders for preventive services (34 percent vs. 25 percent).

Figure 3 shows the number of types of HIT used by all physicians, primary care physicians, and specialty physicians. About 30 percent of physicians adopted only a few (zero to two) types of HIT, and less than 20 percent of physicians adopted most (seven to nine) of the HIT types. Some differences were observed in adoption of HIT by PCPs and specialists; PCPs were more likely to adopt zero to two types of HIT, while specialists were more likely to adopt five to six types of HIT. Table 1 shows descriptive statistics for the rest of the measures. Primary care physicians were more likely to be female, foreign trained, and younger than specialists.

Logistic regression results (Table 2) indicate that some types of HIT are associated with physician career satisfaction while other types of HIT are associated with dissatisfaction. The model that included all physicians indicates that using HIT to look up clinical guidelines (odds ratio [OR] = 1.22), communicate with other physicians (OR = 1.31), and e-mail patients (OR = 1.35) was associated with a “very satisfied” career assessment. E-mailing patients was positively associated with “very satisfied” career assessments among primary care and specialty physicians. Using HIT to communicate with other physicians was also positively associated with “very satisfied” career assessments among specialty physicians. However, using HIT to write notes in patient charts was negatively associated with “very satisfied” career assessments among specialists (OR = 0.75). PCPs were also more likely to be less satisfied with their careers if they used HIT to write prescriptions (OR = 0.67).

The number of types of HIT used by physicians was also associated with physician reports of career satisfaction (Table 3). Physicians who used five to six or seven to nine types of HIT were more likely than physicians who used zero to two types of HIT to be “very satisfied” with their careers (OR = 1.46 and 1.47, respectively). The same relationship was observed for specialty physicians (OR = 1.47 and 1.57, respectively).

A few patterns emerged for the rest of the independent variables across both sets of models in Tables 2 and 3. Physicians reporting that their local market was “very competitive” were less satisfied with their careers across all six statistical models (OR range = 0.66 to 0.71). Physicians who treated chronically ill patients (OR range = 0.57 to 0.87) or patients with language barriers (OR range = 0.47 to 0.58) were also less likely to report being “very satisfied” with their careers. PCPs were less likely to be very satisfied with their careers than specialists (OR = 0.82); black PCPs were less likely to be very satisfied than white PCPs (OR = 0.50); and PCPs in practices with fewer than 5 colleagues were less likely to be very satisfied than physicians in practices with more than 20 colleagues (OR = 0.75). Obstetricians/gynecologists were less likely to be satisfied with their careers than internists (OR = 0.72) while pediatricians were more likely to be very satisfied compared to internists (OR = 1.71).

Discussion

This study examined the relationship between use of HIT and physician career satisfaction. Physicians were classified from very low to very high users of HIT. Using more information technology was the strongest positive determinant of physicians’ being very satisfied with their careers, which lends support to the importance of resources for physicians in patient care.^{61–66} The positive association with high usage of information technology was found for all physicians and for specialists but not for primary care physicians. One possible explanation of this finding is that some of the types of HIT examined in this study were helpful for specialists but not as helpful for PCPs. The differences in their practice styles and relationships with other providers in the community may limit the utility of certain types of HIT. In addition, the ability of HIT to impact physician career satisfaction may be less pronounced for primary care physicians than for other physicians, which suggests that some forms of HIT may not be as helpful in improving job satisfaction.

Information technology use for communicating with physicians and for e-mailing patients was positively associated with career satisfaction, while technology use for writing notes and prescriptions was negatively associated with career satisfaction. The positive associations with quality-of-care variables such as communicating with physicians and e-mailing patients were

expected, since prior studies revealed the importance of providing high-quality care and patient-centered care.⁶⁷⁻⁷² Several studies have found that writing notes and prescriptions added to the physician workload, thus creating an additional burden, which supports our findings of the negative association with career satisfaction.^{73, 74} Our findings suggest that the HIT packages available for these activities are not adequate for physician needs or that physicians require more training or time to adapt to these new technologies.

The data set includes a comprehensive set of variables about the physician, practice, and patient mix, but some limitations stem from the data on HIT. The survey asked physicians whether they have the nine types of HIT in their practice. Information on how often the physician uses these technologies or whether the physician is satisfied with these technologies was not available. This information would have been helpful since other studies have documented some physician frustration over adopting HIT. Still, the data include a rich set of HIT uses, and calculating the number of HIT types adopted gives a measure of the technology preferences of the practice. Another study limitation is the time that has elapsed since the survey was administered. Current utilization of health information technology by physicians might be different from that in 2004–2005 given that the percent of physicians in practices with health information technology has increased since 2001.⁷⁵ Toward that end, when the Health System Change Health Tracking Physician Survey for 2008 (survey name changed in 2008) becomes available we will conduct follow-up research in this area to examine common trends.

HIT and physician career satisfaction have been documented to influence the quality of patient care; however, no previous research has examined how HIT may affect physician career satisfaction. This study was also the first to explore whether the relationship between HIT and career satisfaction differs between primary care physicians and specialists. The results indicate that PCPs and specialists respond to HIT in their practices in different ways, which is consistent with the amount of resources available to each type of provider as well as the differences in the typical doctor-patient interactions for these physician types.

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Notes

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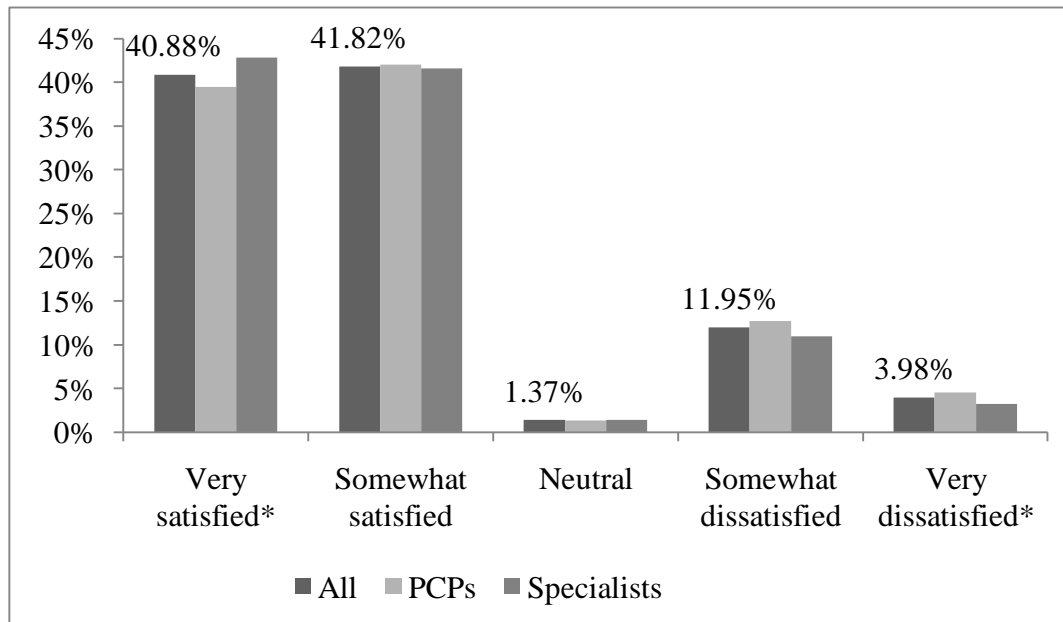
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Figure 1

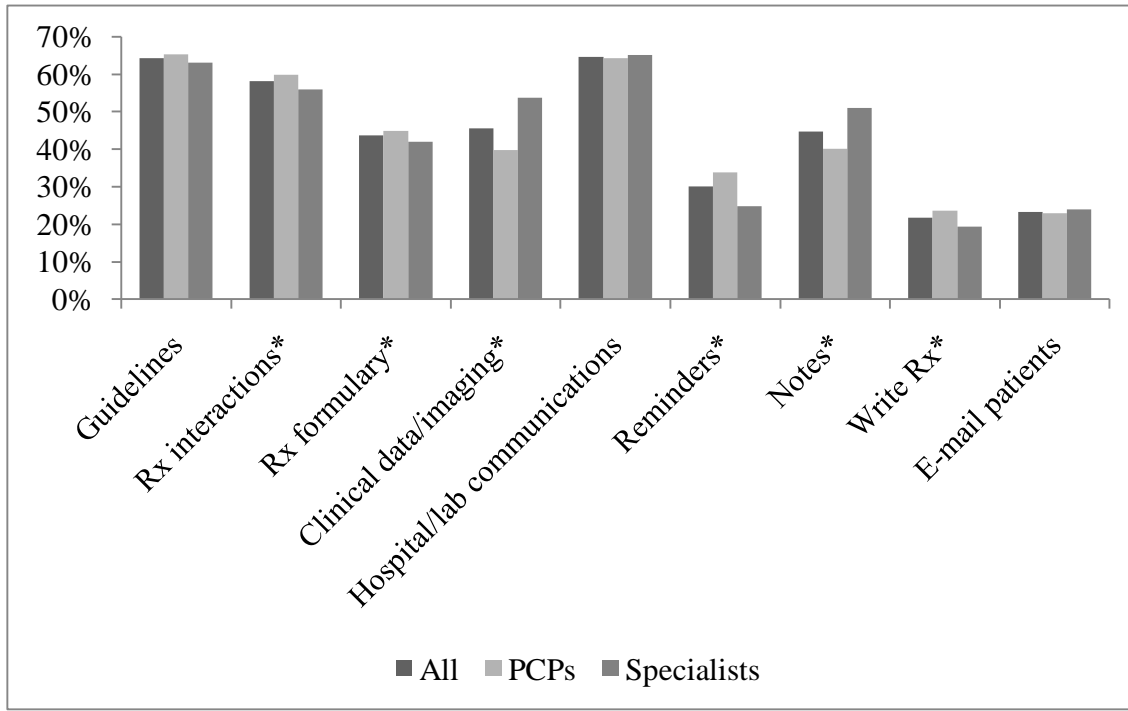
Reports of Career Satisfaction by Physician Type



* Responses for PCPs and specialists were statistically different ($p < .05$, χ^2).

Figure 2

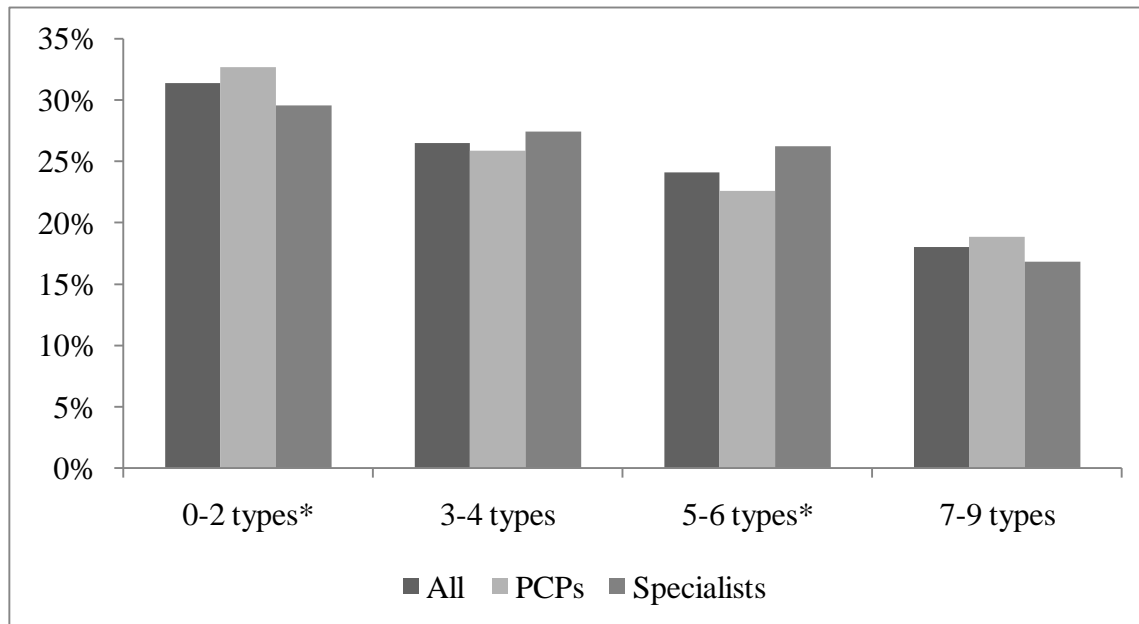
Use of Health Information Technology (HIT) by Physician Type



* Responses for PCPs and specialists were statistically different ($p < .05, \chi^2$).

Figure 3

Number of Types of Health Information Technology (HIT) Used by Physician Type



* Responses for PCPs and specialists were statistically different ($p < .05$, χ^2).

Table 1

Descriptive Statistics for Independent Variables

	All Physicians <i>n</i> = 5198	PCPs Only <i>n</i> = 3016	Specialists Only <i>n</i> = 2182
Practice characteristics			
Competition	19.5% (1012)	17.5% (528)	22.2% (484)
Practice size			
Single practice	25.4% (1320)	25.1% (758)	25.8% (562)
2–5 docs	31.8% (1653)	33.6% (1013)	29.3% (640)
6–19 docs	21.5% (1118)	20.2% (609)	23.3% (509)
>20 docs	21.3% (1107)	21.1% (636)	21.6% (471)
Medicaid revenue			
Very low (0–4%)	26.9% (1400)	27.8% (838)	25.8% (562)
Low (5–10%)	34.0% (1769)	31.0% (935)	38.2% (834)
Medium-high (11–100%)	39.0% (2029)	41.2% (1243)	36.0% (786)
Physician characteristics			
Female	27.0% (1404)	34.4% (1037)	16.8% (367)
Foreign trained	19.5% (1014)	21.4% (644)	17.0% (370)
Board certified	91.4% (4750)	90.1% (2718)	93.1% (2032)
Race/ethnicity			
White	75.7% (3935)	72.9% (2200)	79.5% (1735)
Black	4.0% (206)	4.9% (148)	2.7% (58)
Hispanic	4.8% (252)	6.0% (180)	3.3% (72)
Asian	12.7% (661)	13.8% (415)	11.3% (246)
Other	2.8% (144)	2.4% (73)	3.3% (71)
Age			
<40	23.2% (1208)	25.7% (774)	19.9% (434)
41–49	30.1% (1567)	29.6% (894)	30.8% (673)
50–59	30.4% (1580)	30.0% (904)	31.0% (676)
>60	16.2% (843)	14.7% (444)	18.3% (399)
Primary care	58.0% (3016)		
Physician type			
Internal medicine	16.4% (850)	28.2% (850)	--
Family practice	23.0% (1198)	39.7% (1198)	--
Pediatrics	12.6% (653)	21.7% (653)	--
Ob-gyn	6.1% (315)	10.4% (315)	--
Specialist	22.1% (1151)	--	52.8% (1151)
Surgery	15.6% (812)	--	37.2% (812)
Psychiatry	4.2% (219)	--	10.0% (219)

Profile of patients

% patients with language barrier

none	23.1% (1201)	25.3% (764)	20.0% (437)
1–5%	61.6% (3201)	62.1% (1873)	60.9% (1328)
6–100%	15.3% (796)	12.6% (379)	19.1% (417)

At least 10% of patients

Are Asian	10.1% (526)	11.2% (339)	8.6% (187)
Are Black	45.2% (2348)	44.2% (1333)	46.5% (1015)
Are Hispanic	35.5% (1844)	34.4% (1037)	37.0% (807)

% patients with chronic illness

0–25%	24.0% (1250)	27.9% (842)	18.7% (408)
25–50%	21.2% (1104)	20.6% (620)	22.2% (484)
51–75%	22.8% (1184)	24.4% (735)	20.6% (449)
76–100%	31.9% (1660)	27.2% (819)	38.5% (841)

Note: Some percentages do not total 100 due to rounding.

Table 2

Logistic Regression Results for Types of Health Information Technology (HIT) Used by Physicians Who Are “Very Satisfied” with Careers

Type of HIT	All Physicians (n = 5198)	
	OR (CI)	p-value
Clinical guidelines	1.22 (1.00–1.48)	.0468
Drug interactions	1.25 (1.00–1.57)	.0531
Drug formularies	0.94 (0.77–1.14)	.5352
Communicate with other physicians	1.31 (1.06–1.62)	.0122
Communicate with hospital/lab	0.87 (0.72–1.05)	.1399
Prevention reminder	1.03 (0.86–1.24)	.7131
Write notes in chart	0.82 (0.66–1.02)	.0684
Write prescriptions	0.96 (0.77–1.20)	.7501
E-mail patients	1.35 (1.12–1.64)	.0022

Type of HIT	PCPs Only (n = 3016)	
	OR (CI)	p-value
Clinical guidelines	1.19 (0.94–1.52)	.1522
Drug interactions	1.16 (0.88–1.53)	.3059
Drug formularies	0.99 (0.79–1.24)	.9292
Communicate with other physicians	1.12 (0.84–1.49)	.4476
Communicate with hospital/lab	0.87 (0.67–1.13)	.2893
Prevention reminders	1.15 (0.91–1.46)	.2279
Write notes in chart	1.05 (0.81–1.36)	.7286
Write prescriptions	0.67 (0.50–0.89)	.0066
E-mail patients	1.36 (1.03–1.78)	.0295

Type of HIT	Specialists Only (n = 2182)	
	OR (CI)	p-value
Clinical guidelines	1.17 (0.88–1.55)	.2781
Drug interactions	1.22 (0.89–1.67)	.2082
Drug formularies	0.88 (0.65–1.20)	.4266
Communicate with other physicians	1.52 (1.09–2.13)	.0141
Communicate with hospital/lab	0.89 (0.66–1.20)	.4577
Prevention reminders	0.95 (0.72–1.27)	.7466
Write notes in chart	0.75 (0.57–0.98)	.0355
Write prescriptions	1.28 (0.89–1.86)	.1877
E-mail patients	1.36 (1.02–1.81)	.0379

Note: This model was controlled for practice and physician characteristics and profile of patients.

Table 3

Logistic Regression Results for Number of Types of Health Information Technology (HIT) Used by Physicians Who Are “Very Satisfied” with Careers

Number of HIT Types Used	All Physicians (<i>n</i> = 5198)	
	OR (CI)	<i>p</i> -value
0–2 types	–	–
3–4 types	1.11 (0.89–1.39)	.3396
5–6 types	1.46 (1.14–1.85)	.0025
7–9 types	1.47 (1.10–1.95)	.0086

Number of HIT Types Used	PCP Only (<i>n</i> = 3016)	
	OR (CI)	<i>p</i> -value
0–2 types	–	–
3–4 types	1.18 (0.92–1.51)	.1873
5–6 types	1.37 (0.99–1.88)	.0557
7–9 types	1.30 (0.92–1.85)	.1383

Number of HIT Types Used	Specialists Only (<i>n</i> =2182)	
	OR (CI)	<i>p</i> -value
0–2 types	–	–
3–4 types	1.04 (0.75–1.44)	.8045
5–6 types	1.47 (1.06–2.04)	.0198
7–9 types	1.57 (1.05–2.35)	.0271

Note: This model was controlled for practice and physician characteristics and profile of patients.