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Healthcare System Effects of Pay-for-performance for Smoking Status Documentation

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Abstract

OBJECTIVE—To evaluate the impact on smoking status documentation of a payer-sponsored P4P incentive that targeted a minority of an integrated healthcare delivery system's patients.

STUDY DESIGN—Three commercial insurers simultaneously adopted P4P incentives to document smoking status of their members with three chronic diseases. The healthcare system responded by adding a smoking status reminder to all patients' EHR. We measured change in smoking status documentation before (2008–09) and after (2010–11) P4P implementation by P4P-eligibility.

METHODS—P4P-eligible patients were compared primarily to a subset of non-P4P-eligible patients who resembled P4P-eligible patients and also to all non-P4P-eligible patients. Multivariate models adjusted for patient and provider characteristics and accounted for provider-level clustering and pre-implementation trends.

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RESULTS—Documentation increased from 48% of 207,471 patients before P4P to 71% of 227,574 patients after P4P. Improvement occurred both among P4P-eligible patients, 56% to 83% (AOR, 3.6; 95% CI, 2.9 to 4.5) and the comparable subset of non-P4P-eligible patients, 56% to 80% (AOR, 3.0; 95% CI, 2.3 to 3.9). The difference in improvement between groups was significant (AOR, 1.3; 95% CI, 1.1 to 1.4, p=0.009).

CONCLUSIONS—A P4P incentive targeting a minority of a healthcare system's patients stimulated adoption of a system-wide EHR reminder and improved smoking status documentation overall. Combining a P4P incentive with an EHR reminder might help health care systems improve treatment delivery for smokers and meet Meaningful Use standards for EHRs.

BACKGROUND

Smoking kills over 440,000 people in the United States annually and remains the leading preventable cause of death.[1, 2] Despite the availability of effective treatments for tobacco dependence, physicians assess smoking at only 63% of visits and offer counseling to only 21% of smokers.[3] Identification and documentation of smoking status are the first steps to addressing tobacco dependence and have been shown to increase physicians' delivery of treatment for tobacco dependence.[1] U.S. clinical practice guidelines for treating tobacco dependence recognize the importance of documentation and call for routine smoking status screening and documentation by healthcare systems. The U.S. government's 'Meaningful Use' electronic health record (EHRs) incentive program requires smoking status identification in a coded field.[1, 4] Yet, achieving a high rate of smoking status documentation is a challenge for many healthcare systems.[5]

Efforts to improve smoking status documentation have included electronic or paper-based reminders, performance feedback, and a simple vital sign stamp.[1, 6–16] Pay-for-performance (P4P) incentives have been used in some systems to promote delivery of guideline-based tobacco treatment, or as a component of broader quality improvement (QI) efforts.[7–9, 17, 18] These studies have examined performance incentives for various guideline-based treatment activities, including smoking status documentation, documentation of physician-delivered counseling, referral to telephone smoking cessation counseling, and even payments to providers for patients' tobacco abstinence. However, prior studies of P4P for smoking status documentation were limited to US physician groups or healthcare delivery systems outside the US.[7–9, 17, 18] Relatively little is known about the effects of P4P programs in large, US, multi-payer, integrated healthcare delivery systems in which P4P incentives do not apply to all patients in the system. A payer-sponsored P4P incentive in a multi-payer system may only be effective for the patient population to whom it applies. However, practice changes stimulated by a targeted P4P measure can have broader benefits that improve documentation and treatment delivery for both targeted and non-targeted patients.

A P4P incentive that was introduced in 2010 in a large, diverse multi-payer healthcare delivery system rewarded practices for documenting the smoking status of patients with specific commercial insurers and three chronic diseases. The organization's multiple payers and diverse provider groups with varied practice styles and patient populations makes standardized quality improvement efforts especially challenging. Our objective was to study the effect of a targeted, payer-sponsored P4P incentive payment on smoking status documentation across the healthcare system.

METHODS

Study Setting

Partners HealthCare, Inc. is a large integrated healthcare delivery system in eastern Massachusetts whose provider network, Partners Community HealthCare, Inc. (PCHI),

represents over 5,000 primary care and specialist physicians and works with multiple payers including commercial insurers, Medicare, and Medicaid.[19, 20] PCHI-affiliated practices use several different electronic health records (EHR). This study was restricted to the practices using the system's predominant EHR, which is locally-developed and includes progress notes, laboratory results, medication lists, electronic prescribing, and a variety of clinical reminders [21].

Intervention

Since 2001, PCHI has negotiated P4P contracts with three large, commercial, not-for-profit insurers who collectively cover the majority of commercially insured patients.[20] Starting January 1, 2010, the three commercial insurers contracted separately with PCHI to pay practices for achieving a target smoking status documentation rate among a group of high-risk patients. The incentive was implemented using a withheld amount that was returned to practices meeting the pre-specified target. The amount of payment to practices varied depending on revenue from P4P-eligible patients and ranged from 3% to 4.8% of practice revenue from the participating insurers for all P4P measures and a total $3.8 million at risk in PCHI for the smoking status documentation measure. The target documentation rate was 80% among eligible patients by the end of a two year span (January 1, 2010 to December 31, 2011) with payment at the end of the first year for progress toward the goal and at the end of the second year for reaching the goal.

Eligible patients were adults (≥ 18 years old) who made a visit to a PCHI outpatient practice during the measurement period, were insured by one of three participating commercial insurers, and had a high-risk chronic condition (hypertension, diabetes, or coronary heart disease). The eligible visit could have been to any PCHI specialist or primary care practice in their academic-affiliated or community-based practices.

To help practices reach the 80% target, PCHI added an organization-wide clinical decision support tool consisting of a clinical reminder to document smoking status in all patients' EHR. The non-targeted EHR reminder was implemented concurrently with the pay-for-performance program on January 1, 2010. The EHR-based reminder was designed so that clicking the reminder linked to the coded field for smoking status documentation. Documentation could also be accessed in the EHR through a vital signs entry screen or a health monitoring grid which tracks preventive care and chronic disease management.

Design

To measure the effects of the P4P program on prevalent smoking status documentation, we conducted an observational study before and after P4P implementation. We compared smoking status documentation between the group of high-risk patients who were targeted by the P4P incentive and (1) all non-P4P-eligible patients and (2) a subset of non-P4P-eligible patients who most resembled the P4P-eligible group by having commercial insurance and the same targeted diagnoses as P4P-eligible patients. The study was approved by Partners HealthCare System's Institutional Review Board.

Data Source

We used data from the EHR to estimate the effect of the P4P incentive on smoking status documentation. We identified adult patients (≥ 18 years old) who had an office visit with a PCHI provider before (2008 to 2009) or after (2010 to 2011) the P4P incentive. We extracted patient data including smoking status, age at the visit, gender, race/ethnicity and primary language entered at registration, insurance, primary care-provider, and number of outpatient visits to PCHI practices. We also identified the three high-risk, chronic conditions included in the P4P incentive. Patients were designated as having the chronic condition if

the diagnosis was entered into the EHR before the qualifying visit for that period. Hypertension was defined as having hypertension as a coded entry on the problem list, the last systolic blood pressure greater than 135 mmHg or the last diastolic blood pressure greater than 85mmHg. Coronary heart disease was based on coded problem list entries of coronary arteriosclerosis, angioplasty, stent placement, coronary artery bypass graft, or myocardial infarction. Diabetes was based on coded problem list entry of diabetes or an HbA1c greater than 7.0.

We included provider level demographic data (age and gender) for the primary care provider designated in patients' EHR registration at the start of the study year. Provider level data was taken from a master provider list maintained by PCHI. Some provider level data were missing; for these, we included a dummy-variable for missing provider data.

Outcome

Smoking status documentation is designated in a structured field in the LMR as: 'Active smoker', 'Past smoker', and 'Never smoker.' To measure the change in documentation before and after implementation of the P4P incentive, we calculated prevalent documentation of smoking status on December, 31 of 2009 and 2011. To match the two year duration of the P4P program, we pooled patients with at least one visit in the two years before (2008–9) and the two years after (2010–11) the P4P implementation. In addition to matching the incentive program, we hypothesized that documentation prevalence would not be significantly different from year to year before P4P implementation, and confirmed this hypothesis prior to pooling.

Data Analysis

We calculated the unadjusted prevalence of smoking status documentation before and after the P4P implementation among P4P-eligible patients (as defined above), among all non-P4P-eligible patients, and further among a subset of the non-P4P-eligible patients who were comparable to eligible patients in having had a visit to a PCHI provider, a qualifying high-risk chronic condition, but a non-participating commercial insurer.

We used multivariable logistic regression modeling to test the hypothesis that P4P measures plus the EHR reminder increased rates of smoking status documentation after the contract was introduced January 1, 2010. We compared the P4P-eligible and the comparable subset of non-P4P-eligible patient groups before and after P4P implementation using first order interaction terms. We adjusted for patient age, sex, race/ethnicity, language, and number of visits per year and provider age and gender. To account for clustering, we chose to cluster at the provider level rather than practice level as the higher level unit of analysis because changing provider behaviors was the primary aim of both the P4P and the EHR reminder. We accounted for clustering using generalized estimating equations (GEE) techniques. We also investigated practice-level effects by calculating the proportion of visits to each practice by patients with P4P insurance. We found no association between clinics' proportion of P4P insured visits and patient eligibility so we did not include this in multivariable analyses.

We calculated adjusted odds ratios (AOR) comparing smoking status documentation before and after P4P implementation among the P4P-eligible group and the non-P4P-eligible comparison group. The first order interaction terms of time (before and after) by P4P eligibility were used to test whether the patients targeted by the P4P had higher rates of documentation than those not targeted. We also tested the difference in change in documentation by eligibility. Analyses were performed with SAS, version 9.3 (Cary, NC).

RESULTS

From 2008 to 2009, 207,741 adults had one or more visits to PCHI outpatient providers who used the LMR system for their records. Among these, 5,671 (3%) were eligible for the P4P and 1,209 (1%) were in the similar but non-P4P-eligible control group (Figure 1). The P4P-eligible and similar but non-P4P-eligible patients together were seen by 807 providers who individually saw between 1 and 191 of the patients with one of the three chronic diseases and commercial insurance. In 2010 and 2011, after the P4P introduction, 227,574 adults visited outpatient clinics using LMR and 10,236 (4%) were eligible for the P4P while 2,120 (1%) were in the non-P4P-eligible comparison group (Figure 1).

Compared to all non-P4P patients, P4P-eligible patients were older and more likely to be male, black, English-speaking, and to make more visits per year (Table 1). Providers of P4P patients were more likely to be female and were older. The subset of non-P4P-eligible patients were slightly older (55 vs. 54 years) but otherwise similar to P4P-eligible patients.

Overall, smoking status increased each year among all patients seen during the study period, from 47% in 2008 and 49% in 2009 to 63% in 2010 after the P4P and 74% in 2011. The relative increase in documentation from 2008 to 2011 was the largest among ‘Never smokers’ with documentation increasing by 26% in this group compared to an 18% increase in ‘Past smokers’ and a 14% increase in ‘Active smokers.’ By eligibility, the increase in documentation was greater among P4P-eligible patients than among all non-P4P-eligible patients or the subset of non-P4P-eligible patients who were comparable to the P4P-eligible patients (Figure 2). When patients were pooled into two-year periods before and after P4P, documentation increased among the P4P-eligible from 56% before (2008–9) to 83% after P4P implementation (2010–11) (Table 2). The increase was similar among the subset of similar but non-P4P-eligible patients (56% to 80%) and smaller among all non-P4P-eligible patients (48% to 71%).

In multivariable logistic regression models, both P4P-eligible and the similar but non-P4P-eligible patients were more likely to have a documented smoking status after the P4P was implemented. We compared documentation after the P4P was implemented with before among P4P-eligible patients (AOR 3.6; 95% CI, 2.9 to 4.5, $p<0.001$) and the similar subset of non-P4P patients (AOR 3.0; 95% CI, 2.3 to 3.9, $p<0.001$) (Table 3). Before the P4P, there was no difference in documentation between the P4P-eligible patients and the similar subset of non-P4P-eligible patients (AOR 1.0; 95% CI 1.0-1.1, $p=0.45$). After the P4P documentation was higher among the P4P-eligible patients compared to the subset of non-P4P-eligible patients (AOR 1.3; 95% CI 1.1-1.4, $p=0.009$). The difference-in-differences between P4P-eligible and non-P4P-eligible was significant ($p<0.001$). Other characteristics that were independently associated with an increase in smoking status documentation were older age, female gender, black or Hispanic race, non-English speaking, having a younger PCP, and a female PCP.

DISCUSSION

A targeted P4P incentive from insurers that stimulated adoption of a system-wide EHR reminder significantly improved smoking status documentation in a large multi-payer integrated healthcare delivery system. Although the P4P incentive applied to only a minority of patients in the system, smoking status documentation rates increased among all patients.

Among patients targeted by the P4P incentive, the improvement in documentation could be attributable to the performance incentive, the EHR reminder, or both. That the effect was slight but statistically significant among P4P-targeted patients compared to non-targeted patients suggests that the financial incentive added to the effect of the EHR reminder alone.

Our findings are consistent with prior work in single payer systems or physician group practices that demonstrated the effectiveness of performance incentives for improving smoking status documentation [7, 9, 17, 18]. In our own system, a decision support program for chronic disease management had the greatest improvement in measures that were also incentivized with a P4P contract [22]. These data suggest that combining a P4P incentive with an EHR reminder may be an effective way for integrated healthcare delivery systems to promote provider behavior change and reach Meaningful Use goals for smoking status documentation.

A unique feature of this study was the opportunity to observe the effect of a P4P incentive on patients in the same practices who were not targeted by the incentive. The increase in smoking status documentation among these patients was likely attributable to the EHR reminder that was implemented for all patients. Had the EHR reminder not been implemented, providers might still have responded to the targeted P4P incentive by altering their smoking status documentation practice for all patients, since it required minimal additional work. However, we cannot determine whether this “spill-over” effect occurred in this observational study.

In general, P4P programs that promote documentation improve process measures but have not demonstrated effects on quality of care or patient outcomes.[23] Screening patients for tobacco use has been associated with increased treatment delivery in some settings, but increased cessation rates have not been demonstrated in prior studies.[24–27] However, the evidence base linking brief clinician interventions with smoking cessation outcomes is strong [1]. Furthermore, smoking status documentation may have additional benefits in that it enables healthcare systems to implement chronic disease management or population management tools to help smokers achieve cessation outside the clinical encounter.[28]

We acknowledge several limitations to this study. First, we cannot exclude secular trends as an explanation for the increase in documentation in 2010. Notably, Meaningful Use standards for electronic health records were announced in 2010[4], which created an incentive for healthcare systems to improve documentation. However, during the time period of this study, our healthcare system was still engaged in planning activities and had not yet implemented interventions to meet the standard. Second, there may be unmeasured confounders associated with the specific insurer that a patient has. Insurers may be targeting their members who smoke in other ways which then prompt patients to discuss smoking with their provider or the insurers may be contacting their high volume providers to promote smoking status assessment. Third, we used electronic health records to identify patient diagnoses whereas the P4P incentive was administered with claims data. Accurate diagnoses depend on providers maintaining up to date problem lists and may be underreported in this data source. We chose to use EHR data which was readily available and also reflects the information available for clinicians deciding whether to screen patients. If patients with comorbidity were identified in administrative claims but not in our EHR data, they would have been included in our non-P4P-eligible group. This would have made our groups more similar and biased our results toward no effect. A fourth limitation is that the P4P mandated that smoking status be documented at the visit or at some earlier time. Whether smoking status entries from the past are still accurate is unknown. The increase in smoking status documentation also identified more never smokers than current smokers. While the utility of documenting smoking status lies in the system’s ability to identify a population of smokers who can be targeted for treatment and care management, increasing overall documentation also increases accuracy of smoking prevalence estimates and encourages healthcare system action and investment.

In conclusion, a limited P4P incentive targeting only a minority of a healthcare system's patients stimulated the system to adopt a universal EHR reminder to prompt smoking status documentation. The combination improved smoking status documentation among all patients, although improvement was greater among patients targeted by the P4P incentive than those who were not. It appears that the P4P incentive added value beyond its' prompting of a system-wide EHR reminder. These findings suggest that combining a P4P incentive with an EHR reminder could help healthcare systems striving for Meaningful Use goals to improve treatment for tobacco use and enable population health interventions for their patients who smoke.

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A payer-sponsored pay-for-performance incentive for smoking status documentation prompted implementation of a system-wide electronic reminder and improved documentation among all patients in the healthcare system.

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Take-Away Points: Routine documentation of smoking status improves clinicians' delivery of tobacco treatment and is mandated in Meaningful Use standards for electronic health records (EHRs) but can be challenging to accomplish.

- A payer-sponsored pay-for-performance incentive prompted system-wide action by the healthcare system resulting in improved documentation among both targeted and non-targeted patients.
- The effect was greatest among targeted patients, suggesting the financial incentive added value as well as prompting the reminder.
- Combining a performance incentive with an electronic reminder could help healthcare systems to improve treatment for tobacco use and enable population health interventions for patients who smoke.

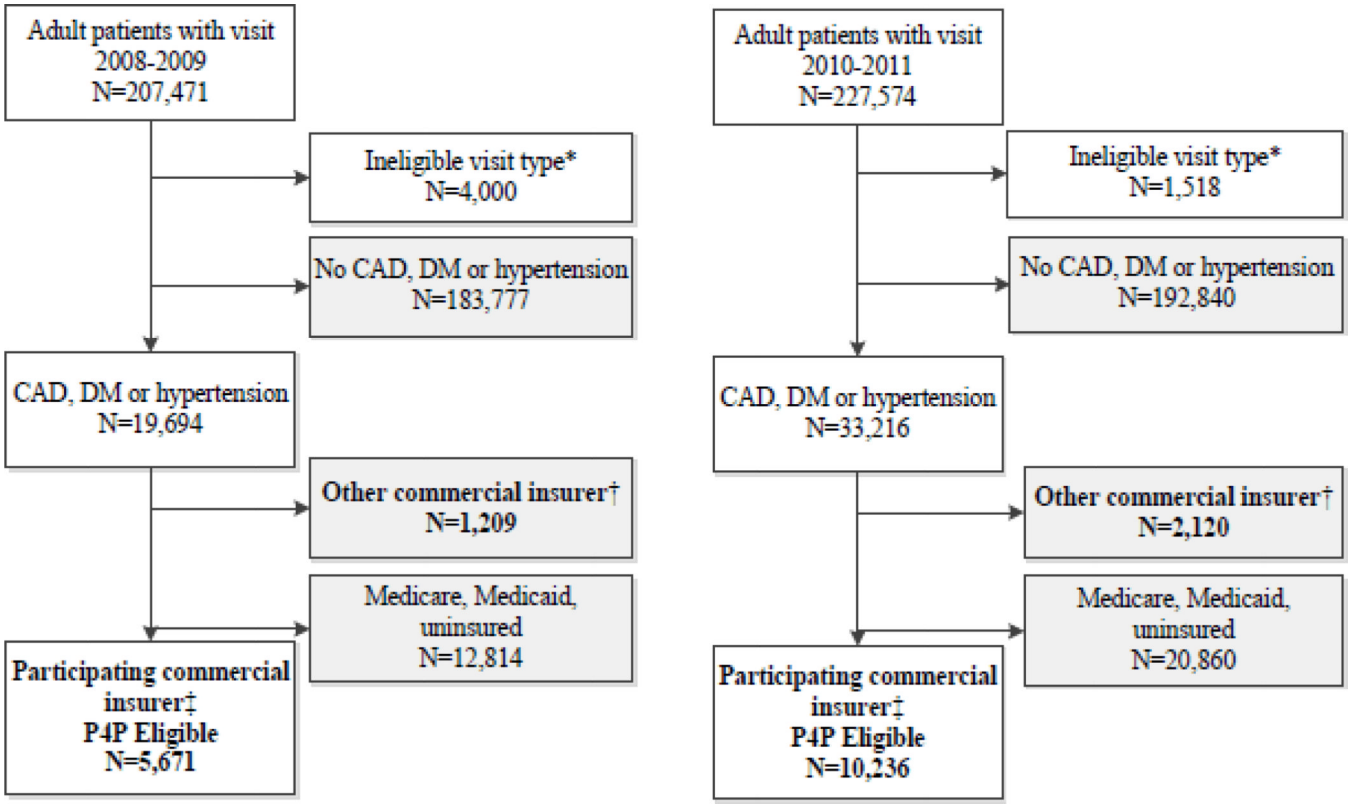

Figure 1.

Patient population before (2008–2009) and after (2010–2011) pay-for-performance (P4P) implementation

* Patients with ineligible visits had only a visit outside of their academic-affiliated or community-based primary care practice.

CAD=coronary artery disease, DM=diabetes mellitus.

Shaded boxes constitute all non-P4P-eligible patients.

†These patients who had CAD, DM or hypertension and a commercial insurer who did not participate in the P4P contract were the subset of non-P4P-eligible patients who were most similar to P4P-eligible patients and were the primary comparison group in adjusted models.

‡Participating commercial insurers were three, not-for-profit insurers who contracted for P4P.

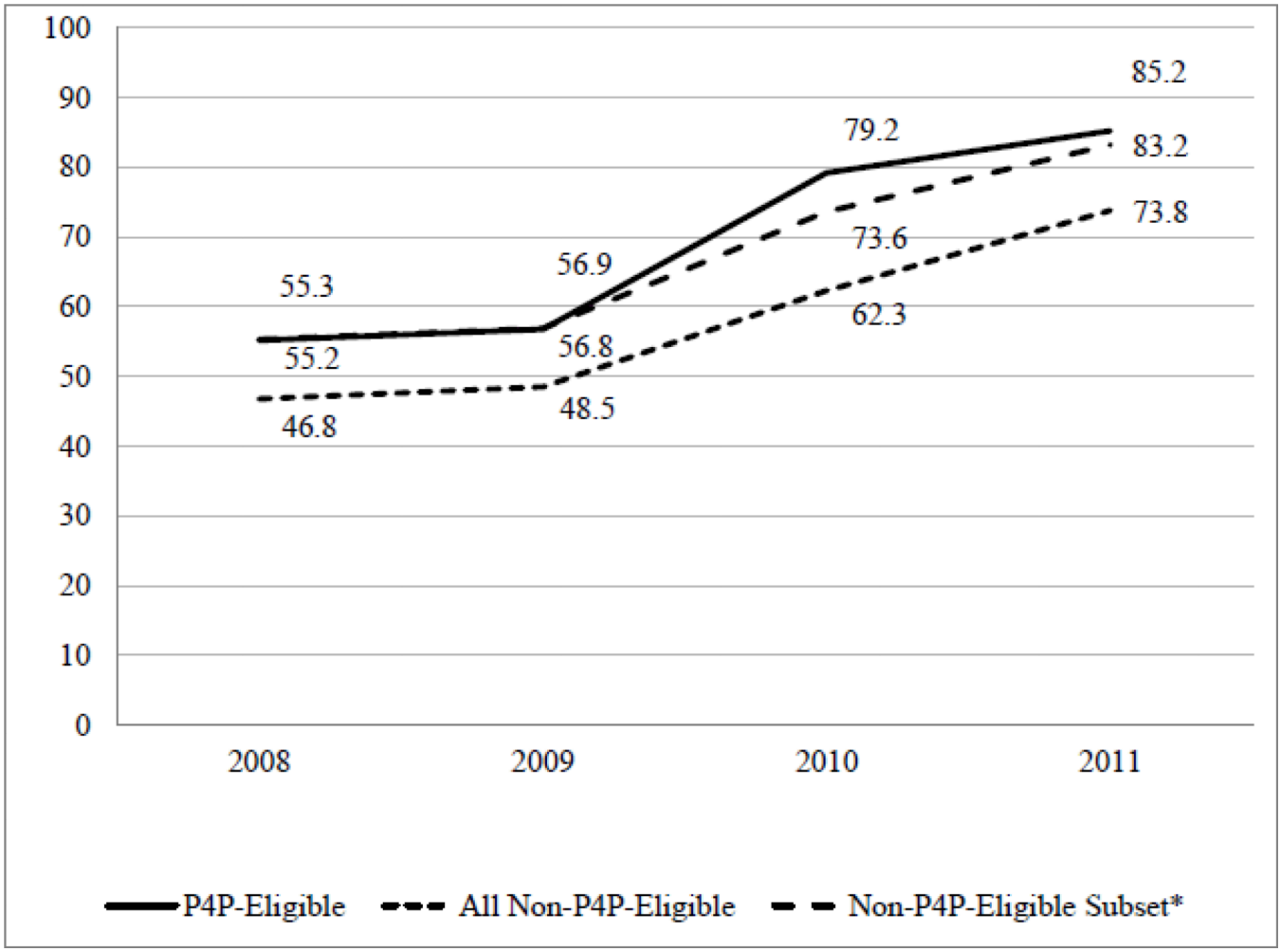

Figure 2.
Unadjusted smoking status documentation by Pay-for-Performance (P4P) eligibility and year
* Patients with commercial insurer that did not participate in the P4P contract and a chronic condition (diabetes mellitus, hypertension, or coronary artery disease).

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Table 1

Adult patients visiting a Partners practice before pay-for-performance (P4P)

	P4P-Eligible N=5,671		All Non-P4P-Eligible N=201,800			Non-P4P-Eligible Subset* N=1,209		
	N	%	N	%	p†	N	%	p†
PATIENT CHARACTERISTICS								
Age at visit--mean (SD)	54	(10)	49	(16)	<0.001	55	(11)	<0.001
Female	2412	42.5	124,983	61.9	<0.001	512	42.3	0.91
Race/ethnicity					<0.001			0.71
White	3,919	69.1	144,303	71.5		831	68.7	
Black	797	14.1	16,045	8.0		179	14.8	
Hispanic	454	8.0	21,838	10.8		99	8.2	
Asian	245	4.3	8,479	4.2		45	3.7	
Other race/ethnicity	31	1.4	1,589	0.8		11	0.9	
Unknown	225	4.0	11,217	5.5		44	3.6	
English speaker	5,281	93.1	181,360	89.9	<0.001	1,108	91.6	0.07
Visits/year--median (IQR)	11	(6–19)	8	(4–15)	<0.001	11	(6–19)	0.64
Insurance				‡				
P4P Commercial Payers	5,671	100.0	101,324	50.2		--	--	
Non-P4P Commercial Payers	--	--	19,921	9.9		1,209	100.0	
Medicaid	--	--	19,116	9.4		--	--	
Medicare	--	--	36,970	18.3		--	--	
Uninsured	--	--	6,596	3.3		--	--	
Other/Missing	--	--	5,705	2.8		--	--	
PROVIDER CHARACTERISTICS								
Female provider	2,151	37.9	68,282	33.8	<0.001	449	37.1	0.89
Provider age at start of study--mean (SD)	49	(10)	48	(10)	<0.001	48	(10)	0.32

*Subset of non-P4P-eligible group with commercial insurer that did not participate in the P4P contract and chronic condition (diabetes mellitus, hypertension, or coronary artery disease).

†P-value based on t-test for continuous variables, Wilcoxon rank sum for count, and chi-square for categorical variables compared to P4P-eligible group.

‡Differences not tested.

Table 2

Unadjusted Tobacco Use Documentation by Pay-for-Performance (P4P) Eligibility Before and After Implementation of Pay-for-Performance

	Documented Tobacco Use Status		Documented Current Smoker	
	N	%	N	%
All P4P-eligible patients				
Before P4P (2008–9)	3,186	56.2	521	9.2
After P4P (2010–11)	8,462	82.7	1,080	10.6
Non-P4P-eligible patient subset*				
Before P4P (2008–9)	680	56.2	126	10.4
After P4P (2010–11)	1,697	80.0	227	10.7
All non-P4P-eligible patients				
Before P4P (2008–9)	96,030	47.6	17,237	8.5
After P4P (2010–11)	153,223	70.5	22,859	10.5

*Patients with commercial insurers that do not participate in the P4P contract and a chronic condition (diabetes mellitus, hypertension, or coronary artery disease).

Table 3

Multivariable Logistic Model Before (2008, 2009) and After (2010, 2011) the Pay-for-performance (P4P) Program by Eligibility

	Adjusted OR*	95% CI	p
P4P-eligible patients			
Before 2008–2009	REF		
After 2010–2011	3.6	2.9–4.5	<0.001
Non-P4P-eligible subset†			
Before 2008–2009	REF		
After 2010–2011	3.0	2.3–3.9	<0.001

*OR=odds ratios. Odds ratios calculated using first order interaction term between P4P eligibility and time (before P4P implementation versus after). Adjusted for patient age, gender, insurance, English speaking, race/ethnicity, number of visits/year, clinician age, clinician gender, and accounting for clinic level clustering, using generalized estimating equations techniques.

†Subset of Non-P4P-eligiblepatients with a commercial insurer that is not participating in the P4P contract and a chronic condition (diabetes mellitus, hypertension, or coronary artery disease).