

Association Between Physician Compensation Methods and Delivery of Guideline-Concordant STD Care: Is There a Link?

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Objective: To examine the association between primary care physician (PCP) reimbursement and delivery of sexually transmitted disease (STD) services.

Study Design: Cross-sectional sample of PCPs contracted with Medicaid managed care organizations in 2002 in 8 California counties with the highest rates of Medicaid enrollment and chlamydia cases.

Methods: The association between physician reimbursement methods and physician practices in delivery of STD services was examined in multiple logistic regression models, controlling for a number of potential confounders.

Results: Evidence of an association between reimbursement based on management of utilization and the PCP practice of providing chlamydia drugs for the partner's treatment was most apparent. In adjusted analyses, physicians reimbursed with capitation and a financial incentive for management of utilization (odds ratio [OR] = 1.63) or salary and a financial incentive for management of utilization (OR = 2.63) were more likely than those reimbursed under other methods to prescribe chlamydia drugs for the partner. However, PCPs least often reported they annually screened females aged 15-19 years for chlamydia (OR = 0.63) if reimbursed under salary and a financial incentive for productivity, or screened females aged 20-25 years (OR = 0.43) if reimbursed under salary and a financial incentive for financial performance.

Conclusion: Some physician reimbursement methods may influence care delivery, but reimbursement is not consistently associated with how physicians deliver STD care. Interventions to encourage physicians to consistently provide guideline-concordant care despite conflicting financial incentives can maintain quality of care. In addition, incentives that may improve guideline-concordant care should be strengthened.

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Referred to as “the captain of the ship,” the physician traditionally has been the key agent in delivery of healthcare services.¹ Many reforms in financial and organizational incentives have been implemented to control healthcare expenditures and improve quality of care by influencing physicians' practice. Analysts have been tracking how financial and organizational incentives in the healthcare system affect physician practice for decades and they have documented that physicians' practice is related to the incentives in the payment system.²⁻¹⁵ Recent evidence shows a decreasing trend, from 1997 to 2001, in the percentage of physicians who were subject to reim-

bursement based on profiling, patient satisfaction, or quality measures. In 2001, 17% of physicians reported that rates of preventive-services screening were used in determining their compensation. In contrast, the percentage of physicians who are encouraged to follow treatment guidelines has increased.¹⁶

The impact of different types of reimbursement on physician practices has been examined in some detail. The Institute of Medicine reported that payment incentives are misaligned with the delivery of high-quality care.¹⁷ The methods of physician payment (eg, fee-for-service [FFS], salary, capitation) usually do not reward good patient health outcomes. For instance, FFS offers incentives for providing more services, whereas capitation rewards conserving resources. One can result in overuse and the other in restricted use of resources. Although salary-based compensation does not necessarily encourage underuse or overuse, it does not provide incentives for improved productivity or efficiency. None of the payment systems, unless used in conjunction with other strategies, provide incentives for high quality. In some cases, perverse incentives could rise against quality improvement.¹⁷

Evidence shows that capitated physician groups put more emphasis on monitoring overuse than underuse of services like immunization, which may be attributed to financial incentives of capitation.¹⁸ Others have found that physician incentives that are based on the physician's own production (rather than the group) increase physician productivity.¹¹ Some financial-productivity incentives may discourage the delivery of preventive

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care such as Pap smears and cholesterol checks, but not mammograms and flu shots.¹²

Clinical practice guidelines have been developed for many chronic diseases to promote practices that are consistent with current scientific understanding of the disease and treatment modalities, and to provide scientific guidance that could lead to optimal patient health outcomes. For sexually transmitted diseases (STDs), guidelines are primarily developed by the Centers for Disease Control and Prevention^{19,20} and the US Preventive Services Task Force.²¹ In California, state laws and the California Chlamydia Action Coalition²² have provided additional practice guidelines. In combination, these guidelines are designed to promote comprehensive and effective STD care.

Evidence suggests that productivity, quality, and cost-containment incentives are associated with use of practice guidelines.¹³ Self-reported data indicate that for more than 50% of physicians studied, treatment guidelines have a moderate to very large effect on their practice.¹⁶

Although practice guidelines present a potential solution to the complexity of medical decisions,²³ evidence of adherence to guidelines for various diseases has been discouraging.²⁴⁻²⁷ In addition, research on the impact of financial incentives on guideline adherence is limited. A small-scale randomized, controlled trial suggested that FFS physicians provided more care and conformed to pediatric care guidelines, whereas salaried physicians were in less conformity with guidelines.²⁸ However, the current literature provides little information about the impact of reimbursement (and the incentives reimbursement represents) on delivery of STD care.

In this study, we investigate the association between physician compensation—independent of other determinants of physician practice—and the delivery of

guideline-concordant STD care. The STD guidelines we examined included taking a sexual history of the patient at the first nonurgent visit,^{20,22} annual screening of sexually active females 15 to 25 years of age,^{20-22,29} providing chlamydia drugs for the partner's treatment or patient-delivered partner therapy,²² and providing services to minors without parental notification or consent (also California State Law, Family Code §6926(a)).²⁰

Table 1. Reimbursement and Other Characteristics of Primary Care Providers

Characteristic	Percentage (Standard Error)
Reimbursement method and criteria*	
Capitation & quality of care	14 (0.7)
Capitation & productivity	8 (0.7)
Capitation & management of utilization	16 (1.4)
Capitation & financial performance	13 (0.9)
Salary & quality of care	22 (3.1)
Salary & productivity	18 (2.5)
Salary & management of utilization	15 (2.3)
Salary & financial performance	18 (2.5)
Fee-for-service	20 (7.8)
Number of female Medicaid patients aged 15-25 years seen per week	
10 or fewer	43 (2.2)
11 to 25	28 (2.3)
26 or more	26 (1.8)
Solo practice	41 (3.3)
Percentage of patients who are on Medicaid	
10 or fewer	21 (1.6)
11 to 50	44 (1.2)
More than 50	34 (2.0)
Only 1 Medicaid HMO contract	48 (5.8)
Number of medical groups that contract with Medicaid patients	
No medical groups	29 (2.4)
1 medical group	42 (1.7)
2 or more medical groups	30 (2.6)
Female	35 (4.2)
Practicing medicine for 10 years or fewer	28 (2.0)
Primary care physician specialty	
Family or general practice	40 (2.1)
Internal medicine	25 (2.0)
Pediatrics	28 (2.0)
Obstetrics/gynecology	7 (1.6)
Has STD guidelines from CDC or USPSTF	43 (2.4)
Ever received feedback on STD screening from Medicaid HMO/medical group	21 (2.0)
Medicaid plan type	
Two-plan model	69 (6.8)
County organized health system	13 (5.0)
Geographic managed care	18 (4.9)

CDC indicates Centers for Disease Control and Prevention; STD, sexually transmitted disease; USPSTF, US Preventive Services Task Force.

*Not mutually exclusive.

Table 2. Proportion of Primary Care Physicians Who Always or Usually Report Following Guideline Concordant STD Practices by Method of Reimbursement

Guideline	Total	Capitation & Quality of Care	Capitation & Productivity	Capitation & Management of Utilization
Obtain sexual history at first nonurgent visit* [†]	68 (2)	70 (7)	68 (8)	71 (4)
Screen sexually active females aged 15-19 years for chlamydia annually* ^{†,‡,§}	59 (2)	53 (5)	55 (4)	53 (5)
Screen females aged 20-25 years for chlamydia annually* ^{†,‡,§}	62 (2)	52 (4)	60 (3)	57 (4)
Provide chlamydia drugs for partner's treatment* [†]	36 (1)	39 (4)	43 (8)	41 (3)
Provide services to minors without parental/guardian notification or consent* [†]	48 (3)	47 (5)	52 (6)	43 (5)

*Centers for Disease Control and Prevention.

[†]California Chlamydia Action Coalition.

[‡]Health Employer Data Information Set.

[§]US Preventive Services Task Force.

METHODS

Data and Sample

Surveys of Primary Care Physicians (PCPs) contracted with Medicaid HMOs in 2002 in 8 California counties with the highest rates of chlamydia and Medicaid HMO enrollment were used for this study. The PCPs who participated in the survey were contracted with a total of 25 Medicaid HMOs in the selected counties. Three plans folded early in the study period, and their PCPs either re-contracted with another HMO in the study or lost their Medicaid HMO contracts. Two plans with fewer than 10 000 enrollees each refused to participate in the study. An electronic version of the participating plans' PCP directory was obtained, and an unduplicated database of all PCPs contracted with these HMOs was constructed and served as the sampling frame.

These PCPs were contacted by phone up to 12 times for a telephone interview from January through May 2002 and were offered \$75 to participate in the 15-minute survey. The choice of a self-administered survey was offered to those PCPs who were unable to complete the interview by phone. The adjusted response rate was 41% (948) following the methodology used in another national survey of physicians.³⁰ Of the unduplicated list of physicians provided by participating HMOs, 64% (6096) were found to be ineligible primarily due to outdated contact information or contractual changes in the time between the collection of the PCP list from HMOs and the fielding of the survey, and secondarily due to being specialists outside the scope of the study. Additional analysis of respondents and nonrespondents on the basis of available characteristics, including coun-

ty and specialty, did not identify any nonresponse bias in the sample. This study was approved by the appropriate institutional review board, and all study subjects consented to participate in the survey.

Dependent Variables

Primary care physician adherence to STD guidelines was captured on a 5-point Likert scale ranging from 1 to 5, with 1 representing "always," 2 representing "usually," 3 representing "sometimes," 4 representing "rarely," and 5 representing "never." For the following analyses, all adherence variables were dichotomized into those who consistently (always, usually) followed a guideline versus those who did not (sometimes, rarely, never). This decision was based on the assumption that adherence to any practice guidelines often depends on the physician judgment of the appropriateness of the treatment or procedure given the presentation of illness, the patient's characteristics, and other circumstances. Thus, consistent adherence to guidelines can be appropriately defined as "always" and "usually" following guidelines.

Independent Variables

The main independent variable was PCP payment mechanism. Primary care physicians were asked to identify whether they were salaried physicians of an HMO or a medical group. Those who were not salaried were then asked whether they were reimbursed on a capitation or FFS basis by their affiliated health plan or medical group. They also were asked whether they contracted directly with the health plan, or through the medical group that provided the largest proportion of

Percentage (Standard Error)					
Capitation & Financial Performance	Salary & Quality of Care	Salary & Productivity	Salary & Management of Utilization	Salary & Financial Performance	Fee-for-Service
73 (4)	68 (7)	61 (8)	73 (5)	67 (5)	69 (2)
57 (4)	67 (4)	58 (3)	67 (5)	59 (5)	55 (2)
58 (3)	66 (5)	58 (4)	66 (6)	56 (5)	63 (2)
38 (6)	37 (4)	36 (6)	45 [‡] (4)	33 (4)	37 (5)
42 (5)	52 (5)	45 (3)	52 (6)	52 (3)	46 (2)

^{||}The proportion is significantly different ($P < .05$) from those reimbursed by other methods.

[¶]California state law (permits providers to prescribe chlamydia drugs to the patient for partner's treatment).

[‡]The proportion is significantly different ($P < .001$) from those reimbursed by other methods.

their Medicaid HMO patients. Primary care physicians also were asked whether their contracts with their HMOs or medical groups included stipulations for reimbursement based on their productivity (eg, number of visits), quality of care (eg, patient satisfaction or peer review), their management of utilization (eg, rate of referrals, laboratory tests, x-rays), or financial performance of the groups (eg, profit sharing). Each PCP may have reported more than 1 type of reimbursement.

Nine dichotomous independent variables were created to distinguish those PCPs reimbursed on an FFS, capitation, or salary basis and each of the 4 contractual stipulations or reimbursement mechanisms. The percentage of those reimbursed under FFS and any of the 4 reimbursement mechanisms was too small for these groups to be separately identified (ranging between 5.6% to 3%). The remaining variables included the 2 payment methods (capitation and salary) crossed with the 4 reimbursement mechanisms (productivity, quality of care, management of utilization, and financial performance (Table 1). Many PCPs reported more than 1 reimbursement mechanism, so the resulting variables represent mutually exclusive payment methods but overlapping reimbursement mechanisms. Therefore, the analyses of influence of payment on PCP practice are interpreted, for example, as the influence of salary and productivity on PCP practice versus the influence of other payment methods.

A number of other factors that could affect PCP adherence to STD practice guidelines were controlled for in the logistic regression models. These included business characteristics of PCPs (practice setting, volume of Medicaid patients in practice, number of Medicaid HMO

contracts, and number of medical group contracts with Medicaid business), personal characteristics (sex, specialty, and years in practice), having STD guidelines from the Centers for Disease Control and Prevention and US Preventive Services Task Force, having ever received feedback on STD screening from the contracted Medicaid HMO or medical group, and the type of contracted Medicaid managed care health plan (2-plan model: 1 commercial and 1 local initiative plan for beneficiaries to choose from; county organized health system: an agency organized and operated by the county; and geographic managed care: capitated contracts between the state and multiple commercial plans for a geographic area).³¹

Analysis Methods

We examined the extent to which PCPs followed existing STD guidelines given PCP reimbursement. The association between PCPs' adherence to STD practice guidelines and reimbursement (as well as between adherence and control factors) was assessed using chi-square tests of difference and reported at $P < .05$. The relationship between payment and adherence to STD practice guidelines was assessed in a series of logistic regression models controlling for confounding factors. Each model was adjusted for clustering of PCPs within HMOs, using STATA v.7.0.³² The analyses were not weighted otherwise because the sample frame included the universe of PCPs who contracted with the Medicaid HMOs in the selected counties.

Because of the cross-sectional nature of the data, we cannot accurately determine whether there is a causal relationship between the payment-mechanism variables

and the outcomes. It is possible that physicians simultaneously choose their practice based on the payment mechanisms used in that practice. Such physicians also may have characteristics that make them more or less likely to provide recommended STD care. For example, a physician who has a predisposition to follow STD guidelines may prefer to join a group that pays its providers on an FFS basis. Our data do not allow us to determine whether it is the reimbursement variables, or alternatively, unmeasured characteristics of the physician, that cause the physician to provide the given STD care.

To investigate this issue further, we conducted a multinomial logistic regression where payment mechanism (capitation, FFS, or salary) was the dependent variable and various physician and practice characteristics were the independent variables. Several of these variables were found to be statistically significant; to give a single example, physicians who graduated fewer than 10 years ago were more likely to be salaried, and it is plausible that more recently trained physicians are more likely to follow guidelines due to their familiarity with current STD guidelines. Similarly, one might expect several unmeasured characteristics to have similar correlations. Ideally, one would use instrumental-variables techniques to form exogenous predictors of payment mechanisms, but the dataset used does not contain the necessary variables that can predict payment mechanism but are unrelated to the provision of STD care. As a result, the analysis below does not draw conclusions asserting that the payment mechanisms have a causal relationship with provision of care. Rather, only a relationship between the 2 sets of variables is posited.

RESULTS

Sample Characteristics

The most frequent method of reimbursement reported was salary and quality of care (22%), followed by FFS (20%), salary and productivity (18%), salary and financial performance (18%), and capitation and management of utilization (16%) (Table 1). The least commonly used method was capitation and productivity (8%). A large proportion of PCPs (43%) reported seeing 10 or fewer female (15-25 years old) Medicaid patients per week, and a similarly high proportion (44%) reported that their practice consisted of 11% to 50% Medicaid patients. About 2 in 5 (41%) were in solo practice, and less than half (48%) contracted with only 1 HMO or 1 medical group (42%). Thirty-five percent of PCPs were female; 40% were family or general practitioners, 25% were internists, and 28% were pediatricians.

Forty-three percent had STD guidelines from the Centers for Disease Control and Prevention or the US Preventive Services Task Force. Twenty-one percent had ever received feedback on their STD screening practices from their affiliated HMOs or medical groups. Most (69%) were affiliated with HMOs in counties with the 2-plan Medicaid managed care model.

Guideline Adherence

Adherence to guidelines varied by the type of guideline. Primary care physicians most often reported consistently obtaining sexual history at the first nonurgent visit (68%) and screening young females 15-19 (59%) and 20-25 (62%) years of age (Table 2). Primary care physicians least often reported consistently providing chlamydia drugs for the partner's treatment (36%) or providing services to minors without parental or guardian notification or consent (48%).

The type of reimbursement was significantly associated with adherence to 2 guidelines. Those reimbursed under salary and quality of care or salary and management of utilization more often adhered to annual screening of sexually active females aged 15-19 years (67%, $P < .05$) than those reimbursed under other methods. Those reimbursed under capitation and quality of care more often consistently screened females aged 20-25 years for chlamydia annually (52%, $P < .05$) than those reimbursed under other methods. Provision of chlamydia drugs for the partner's treatment was more consistently done by PCPs who were reimbursed under capitation and management of utilization (41%, $P < .05$) or salary and management of utilization (45%, $P < .001$) than those reimbursed under other methods.

Association Between Reimbursement Method and Guideline Adherence

Some reimbursement mechanisms were related to physicians' adherence to 2 guidelines, after accounting for other confounders (Table 3). Salary and productivity were associated with a higher likelihood of consistent chlamydia screening of sexually active females aged 15-19 years annually (odds ratio [OR] = 0.63, $P < .05$), whereas salary and financial performance were associated with a lower likelihood of consistent chlamydia screening of females aged 20-25 years annually (OR = 0.43, $P < .001$). Alternatively, the likelihood of providing chlamydia drugs for the partner's treatment was higher if the PCP was reimbursed through capitation and management of utilization (OR = 1.63, $P < .05$) or salary and management of utilization (OR = 2.63, $P < .05$). Overall, 4 out of 40 reimbursement mechanisms examined showed statistically significant associations with guideline-concordant practices. Only 2 of the 40 reimburse-

Table 3. Multiple Logistic Regressions of Primary Care Providers' Practices Regarding Sexually Transmitted Diseases in Medi-Cal Managed Care

Reimbursement Method	Odds Ratio (95% Confidence Interval)				
	Obtain Sexual History at First Nonurgent Visit	Screen Sexually Active Females Aged 15-19 Years for Chlamydia Annually	Screen Females Aged 20-25 Years for Chlamydia Annually	Provide Chlamydia Drugs for Partner's Treatment	Provide Services to Minors Without Parental Notification/Consent
Fee-for-service	0.99 (0.60, 1.63)	0.96 (0.58, 1.59)	1.32 (0.55, 3.15)	0.59 (0.30, 1.15)	0.75 (0.50, 1.10)
Capitation & productivity	0.93 (0.42, 2.04)	0.64 (0.34, 1.21)	0.67 (0.29, 1.52)	1.52 (0.46, 4.98)	1.16 (0.51, 2.67)
Capitation & quality of care	1.19 (0.69, 2.05)	1.32 (0.65, 2.72)	0.87 (0.43, 1.75)	0.93 (0.49, 1.77)	1.69 (0.92, 3.10)
Capitation & management of utilization	1.30 (0.88, 1.92)	1.10 (0.62, 1.94)	0.96 (0.42, 2.22)	1.63* (1.08, 2.45)	0.75 (0.35, 1.60)
Capitation & financial performance	1.26 (0.76, 2.09)	1.26 (0.87, 1.83)	1.31 (0.73, 2.33)	0.88 (0.43, 1.82)	0.75 (0.49, 1.16)
Salary & productivity	0.65 (0.28, 1.54)	0.63* (0.40, 0.99)	1.33 (0.78, 1.65)	1.06 (0.38, 2.98)	0.58 (0.28, 1.21)
Salary & quality of care	0.99 (0.37, 2.69)	1.45 (0.66, 3.15)	1.37 (0.50, 3.74)	0.78 (0.51, 1.20)	1.10 (0.57, 2.15)
Salary & management of utilization	2.00 (0.68, 5.90)	1.34 (0.72, 2.49)	1.08 (0.41, 2.83)	2.63* (1.20, 5.77)	1.22 (0.73, 2.06)
Salary & financial performance	1.37 (0.82, 2.27)	0.75 (0.46, 1.21)	0.43 [†] (0.30, 0.62)	0.70 (0.38, 1.26)	1.27 (0.67, 2.42)
R ²	16%	28%	35%	7%	24%

**P* < .05.[†]*P* < .001.

ment mechanisms would have been significant at the 5% level by chance.

DISCUSSION

In this study, no clear or consistent patterns emerged indicating a link between methods of PCP payment and PCP delivery of all STD care. Our results do suggest that there may be some associations between reimbursement and delivery of certain guideline-concordant STD services. Financial incentives imbedded in management of utilization may influence the PCP's decision to provide the patient with chlamydia medication for the partner's treatment. This guideline is intended to curb the spread of chlamydia infection and its costly complications in women through treating the partner, overcoming the numerous barriers facing the partner. Treating the partner can ensure that the patient is cured and will not return for additional visits or care because of reinfections and further complications. Curtailing repeated visits can reduce rates of use of physician services, which is the primary goal of management of utilization.

The financial incentives of salaried PCPs with productivity or financial-performance stipulations in their contracts provide disincentives for the annual chlamydia screening recommended by the guideline. Chlamydia testing requires longer appointments to discuss sexual-risk history and possibly to collect a specimen, thereby incurring additional lab costs. Salary and productivity goals could discourage such practices.

The lack of a clear association between reimbursement mechanisms and the outcome variables may be due to the fact that physicians may contract with a number of commercial and Medicaid HMOs and medical groups who may or may not encourage physicians to adhere to certain guidelines. In this study, we examined the relationship between guideline adherence and payment by the HMO and medical groups that provided the largest proportion of Medicaid patients to the physician's practice. The collective impact of various reimbursement mechanisms may paint a different picture of PCP adherence to STD guidelines.

Evidence is emerging about the positive impact of performance contracting on various patient out-

comes,^{33,34} although we did not examine the effect of such techniques on physicians' adherence to guidelines. However, factors such as multiple contracts may dilute the impact of incentives, and physicians' lack of recall of the existence of incentives from certain plans can reduce the effectiveness of such incentives.³⁵ Furthermore, monitoring physician performance can be a costly proposition.³⁶ Additional research is clearly necessary to better understand the relationship between reimbursement mechanisms and physicians' provision of guideline-concordant care or best practices. If reimbursement mechanisms indeed contradict guidelines, modifications of such mechanisms in PCP contractual agreements are needed. Alternatively, reimbursement mechanisms that may jointly increase the positive impact of best-practice guidelines can be incorporated in organizational quality improvement efforts to maximize their utility.

Caveats

This study included only PCPs contracted with California's Medicaid HMOs and excluded PCPs who provided care to Medicaid patients outside the managed care setting. Thus, the findings of this study are applicable to Medicaid HMOs only and cannot be compared with FFS Medicaid. Medicaid HMO providers may differ from FFS Medicaid providers in their delivery of STD care, and California's Medicaid managed care providers may differ from those in other states. Furthermore, all data were self-reported, and physicians have been found to self-report guideline-concordant practices at a consistent, but higher, rate than the rate indicated by chart reviews.^{37,38} In addition, small sample sizes limited our ability to draw further conclusions regarding the potential impact of reimbursement on PCP adherence. Finally, as discussed earlier, causality cannot be inferred from the multivariate analysis because physicians may self-select into practices that have particular payment arrangements.

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