Physicians' Perceptions of Relevant Prescription Drug Costs: Do Costs to the Individual Patient or to the Population Matter Most?

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Objectives: Physicians may be aware of at least 2 types of costs when prescribing: patient's out-of-pocket costs and the actual costs of the medication. We evaluated physicians' perceptions about relevant costs for prescription drugs and the importance of communication about these costs.

Study Design: Mailed survey to a random sample of 1200 physician members of the California Medical Association, and a phone survey of a sample of nonresponders.

Methods: Descriptive statistics of survey items, McNemar's test to compare survey item responses, and logistic regression to evaluate the relationship between physician, practice, and system variables and physicians' perceptions of relevant medication costs.

Results: Of respondents with correct addresses, 49.6% responded to the survey; 13% of nonresponders were contacted by phone. Approximately 91% and 80% of physicians reported that it is important to manage patients' out-of-pocket costs and total medication costs, respectively. When comparing the relative importance of managing the 2 types of costs, 59% of physicians agreed that managing patients' out-of-pocket costs was more important than managing the total medication costs and only 16% disagreed. Physicians believed it was more important to discuss out-of-pocket costs than total costs with patients ($P < .0001$), but only 15% of physicians reported discussing out-of-pocket costs frequently and 5% reported talking about total medication costs frequently. Physicians who managed more Medicare patients had a greater likelihood than physicians managing fewer Medicare patients of prioritizing out-of-pocket cost rather than total cost management ($P = .038$), and generalists had a greater likelihood than medical subspecialists ($P = .046$).

Conclusions: Physicians prioritize managing out-of-pocket costs over total medication costs. Pharmacy benefit designs that use patient out-of-pocket cost incentives to influence utilization are addressing the costs to which physicians may be most responsive. When physicians face conflicts between managing patients' out-of-pocket costs and total costs, they will likely try to protect the patients' resources at the expense of the insurer or society. Efforts to align patients', insurers', and societies' incentives will simplify prescribing decisions and result in better value in prescribing.

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Exposure to rapidly rising prescription drug costs has prompted insurers and policy makers to create various cost-control strategies to improve awareness of, and sensitivity to, these costs. Interventions have been created to improve physicians' knowledge about the costs of medications in hopes that awareness of costs may lead to more value-based prescribing.[1-4] Most notably, insurers have broadly implemented incentive-based pharmacy benefit plans to foster increased patient cost sensitivity, in hopes that consumer choice might steer prescribing toward more cost-effective medications.[5] To serve as financial agents for patients and help them manage their out-of-pocket costs, physicians must also be aware of their patients' formularies and out-of-pocket cost requirements.

These differing strategies highlight a critical problem for physicians. Physicians need to be aware of at least 2 types of costs when prescribing: their patient's out-of-pocket costs and the actual costs of the medication. For uninsured patients, managing a patient's out-of-pocket costs is equivalent to managing the actual costs of medication. Most patients in the United States, however, have prescription drug coverage.[6] Managing out-of-pocket costs offers savings to individual patients, whereas managing total medication costs decreases overall prescription drug costs and may offer benefits to the population as a whole.

Numerous studies have evaluated physicians' knowledge about actual costs of prescription drugs, and have generally found that physicians estimate drug costs poorly.[7-9] More recent research has shown that physicians are often unaware of patients' formularies and out-of-pocket costs.[10,11] Patients are often unaware of their costs for medications at the time of prescribing, and rely on physicians to be knowledgeable.[12] These findings highlight the challenge of expecting physicians to be

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knowledgeable about both the patient's out-of-pocket costs and the total costs of medications. Considering the low levels of knowledge of both types of costs, strategies to educate physicians about drug costs may be more effective if they focused on educating physicians about either, but not both, of these 2 kinds of costs, thus simplifying the issue for physicians.

Little is known about what costs are most relevant to prescribing physicians; which costs they believe ought to be communicated to patients; and which costs they think are most valuable in their decision making. One qualitative study that evaluated this topic in Italy and the United Kingdom found that the physicians studied believed that costs to the system were as important as costs to individual patients.[13] No US studies have evaluated whether physicians are more concerned with patients' out-of-pocket costs or the total costs experienced by the population when prescribing. Findings in Europe may not be representative of perceptions in the United States, as cultural norms coupled with a more market-based healthcare delivery system may lead US physicians to emphasize management of the individual patient's costs over societal costs.

An evaluation of the costs that are relevant to physicians when prescribing medications could help explain the decision-making process when efforts to manage a patient's out-of-pocket costs conflict with efforts to control overall spending on medications. In addition, a better understanding of physicians' perceptions about the relevant prescription drug costs and communication about those costs could assist in creating further interventions that target the information that physicians would be most receptive to acting upon. This information could also assist in designing benefit programs that align physician, patient, and insurer incentives. Providers have overwhelmingly adopted tiered pharmacy benefit designs to use patients' out-of-pocket costs to steer prescription drug utilization. We surveyed physicians in California, a populous state with substantial managed care penetration and innovative pharmacy designs, to assess whether out-of-pocket cost-drivers are the most relevant costs to prescribing physicians.

METHODS

Study Sample

Between June and December 2003, we surveyed a random sample of 1200 physician members of the California Medical Association (CMA). We selected our sample size to estimate descriptive statistics, after conservatively predicting our response rate, with narrow confidence intervals (95% confidence intervals [CIs] with a width of less than 5 percentage points). Membership in CMA includes approximately one third of California's physicians.[14] California was selected because it is a large and diverse state with substantial managed care penetration and reliance on formularies. We mailed each physician in our random sample an introductory letter followed by a survey including a $2 gift certificate. The survey cover page identified the academic affiliations of the investigators and stated that the survey was to be used for research purposes. Physicians who did not respond to the first survey were mailed up to 2 more surveys.

Of the 1200 physicians who were mailed surveys, 509 responded. An additional 173 addresses were identified as incorrect because either the mailed surveys were returned to sender or phone calls to nonrespondents identified incorrect addresses. After removing incorrect addresses from the denominator, our response rate was 49.6%. We excluded an additional 34 physicians who reported that they do not prescribe in the outpatient setting either because of their scope of practice (radiologists, anesthesiologists, pathologists, administrators) or retirement.

We did not have any baseline information about the physicians in our sample and could not comment on the differences in characteristics of survey respondents and nonrespondents. To better assess the generalizability of the respondents, we sequentially contacted by telephone a sample of physicians who did not respond to any of the 3 mailings and we performed an abbreviated survey. We aimed to contact 10% of the nonresponders by phone, but our resources allowed us to contact a total of 69 (13%) nonrespondents. We collected information about sociodemographics, several key predictor variables, and all dependent variables from nonrespondents.

Survey Instrument

The survey instrument was constructed through a collaborative and iterative process and was piloted extensively for validation purposes.[10] The instrument included questions with multiple-choice, 5-point Likert scale, and discrete numerical responses.

Dependent variables assessed physicians' perceptions about relevant costs at the time of prescribing. We discriminated between different types of costs by asking physicians to "refer to out-of-pocket costs (what the patient pays) or to the total costs of medications." We asked physicians the extent to which they agree with the statement: "It is important to prescribe [a] drug that will minimize [their] patient's out-of-pocket cost requirements when choosing among equally effective and safe medications." We then asked physicians the extent to which they agree with a similar statement

referring to total medication costs. We also asked physicians whether they believe it is important to discuss out-of-pocket costs and total costs for prescription drugs, and asked physicians to estimate the frequency with which they engage in these discussions. Finally, we asked physicians the extent to which they agree or disagree with the following statement: "When choosing among equally effective and safe medications, I am more concerned with choosing the drug requiring the lowest out-of-pocket cost than choosing the drug with the lowest total cost." All dependent variables used a 5-point Likert scale for responses (strongly agree, somewhat agree, neither agree nor disagree, somewhat agree, strongly agree).

We collected a broad set of predictors to assess factors that influence physicians' perceptions about relevant costs when prescribing. In multivariate analyses, we controlled for physicians' sociodemographic characteristics (age, sex) and specialty, and whether the practice was hospital-based. We explored the relationship between patient insurance mix (ie, uninsured patients or patients in Medicare), practice characteristics (ie, practice size, location, number of prescriptions written, and the number of formularies prescribed from), and information technology systems use (computer order entry, Internet, handheld devices) with physicians' perceptions about relevant costs.

Data Analysis

We used descriptive statistics to examine predictor variables and physicians' perceptions about the importance of managing patients' out-of-pocket costs and total medication costs when prescribing. Physician responses were dichotomized for ease of interpretation. Physicians who somewhat or strongly agreed that out-of-pocket cost management is more important than total cost management were categorized together, while physicians who neither agreed nor disagreed, somewhat, or strongly disagreed with the statement were categorized together. We used logistic regression to evaluate the relationship between predictor variables and physicians' beliefs concerning the comparative importance of managing patients' out-of-pocket costs versus the total medication costs. Missing independent variables in multivariate models were imputed using multiple imputations.[15] Physicians with missing dependent variables were omitted from the analysis, and all independent variables had less than 20% missing values. Sensitivity analyses dropping respondents with missing values were qualitatively similar to models including those respondents. Data from the nonrespondent survey were not included in the final models reported. Rather, nonresponder data were used for sensitivity analyses. We created logistic models pooling data from responder and nonresponder surveys to see if inclusion of nonresponders influenced the relationship between independent and dependent variables in our model. Statistical analyses were performed using SAS 9.1 (SAS Institute, Cary, NC; 2005) and Stata 8.1 software (Intercooled for Windows; STATA Corp, College Station, Tex; 2003).

We calculated McNemar's test statistics to compare responses to survey questions addressing beliefs about discussing out-of-pocket and total costs, and questions concerning the frequency with which physicians engage in such conversations. We performed *t* tests to compare characteristics of physicians in the nonresponder survey with those of physicians who responded to the mailed survey.

RESULTS

Study Population

Among respondents to the mailed survey, 475 physicians reported that they prescribe in the outpatient setting. Characteristics of respondents are in **Table 1**. On average, study physicians were 50 years old; 33% were generalists, 23% medical subspecialists, 18% surgeons, 10% obstetrics and gynecology physicians, 8% emergency room physicians, and 3% psychiatrists. Physicians in this sample were similar to national averages in terms of age, sex, and specialty.[16] Comparisons of mailed survey respondents and nonrespondents who responded to our phone survey indicated no significant differences in age (mean 50.0 vs 52.9 years), sex (72% vs 78% male), number of prescriptions written (24.1 vs 22.2 prescriptions), or specialty.

Physicians' Perceptions of the Importance of Managing and Discussing Patients' Out-of-pocket Costs and Total Medication Costs

Physicians generally agreed with the statement, "When choosing between equally effective and safe medications, it is important to prescribe the drug that minimizes patients' out-of-pocket costs." Almost 91% of physicians surveyed somewhat or strongly agreed that it is "important" to try to minimize patients' out-of-pocket costs when prescribing, and only 5% disagreed (**Figure**). More than 80% of physicians surveyed somewhat or strongly agreed that it is important to try to minimize the total costs of the medication when choosing between equally safe and effective medications, and only 8% disagreed. No significant differences were seen between survey respondents and nonrespondents.

When asked if they agree that "it is important to discuss out-of-pocket cost requirements with patients," 65% somewhat or strongly agreed and only 13% dis-

Table 1. Physician Sample Characteristics

Physician Characteristic (N)	Mean ± SD or Percent
Age (450), y	49.97 ± 9.8
Male (456)	71.93%
Specialty (456)	
Generalist	33.11%
Medical subspecialist	23.03%
Surgeon	17.98%
Ob-Gyn	10.31%
Emergency room	7.89%
Psychiatrist	3.07%
Average number of prescriptions/day (453)	24.14 ± 23.7
Type of facility (456)	
Academic	15.35%
Veterans Administration	1.10%
County facility	6.14%
Hospital-based	42.11%
Practice size (456)	
Solo	43.42%
Medium	26.54%
Large	13.38%
Very large	15.79%
Practice setting (456)	
Urban	37.28%
Suburban	55.26%
Rural	6.58%
Computer order entry (456)	30.92%
Number of formularies prescribed from (456)	
0 to 1 formulary	39.69%
2 to 5 formularies	14.47%
6 or more formularies	19.30%
Don't know	25.66%
Average percent of patients enrolled in Medicare (449)	29.33 ± 21.5
Average percent of uninsured patients (450)	9.73 ± 16.7

agreed (**Table 2**). Approximately 47% of physicians agreed that "it is important to discuss total costs of medications with patients," and 23% disagreed. Almost 23% of physicians reported that they agreed that it is important to talk about out-of-pocket costs but did not agree that it is important to discuss total costs, while only 4% of physicians reported the converse (data not shown; McNemar's test statistic 56.9, $P < .0001$). Yet when physicians were asked if they engage in these conversations with patients, only 15% of physicians surveyed reported that they discuss out-of-pocket costs with patients most or all of the time and only 5% reported that they talk about the total costs of medication most or all of the time (Table 2). More than 12% of physicians reported that they discuss out-of-pocket costs most or all of the time and discuss total costs less frequently, while only 1% of physicians reported the converse (data not shown; McNemar's test statistic 41.3, $P < .0001$).

When asked if they were more concerned with managing patients' out-of-pocket costs than controlling the total cost of medication when choosing between equally safe and effective medications, almost 59% agreed (44% somewhat agreed and 15% strongly agreed), 25% neither agreed nor disagreed, and approximately 16% disagreed (11% somewhat disagreed and 5% strongly disagreed [data not shown]).

Factors Associated With Belief That Managing Out-of-pocket Costs Are More Important Than Managing Total Medication Costs

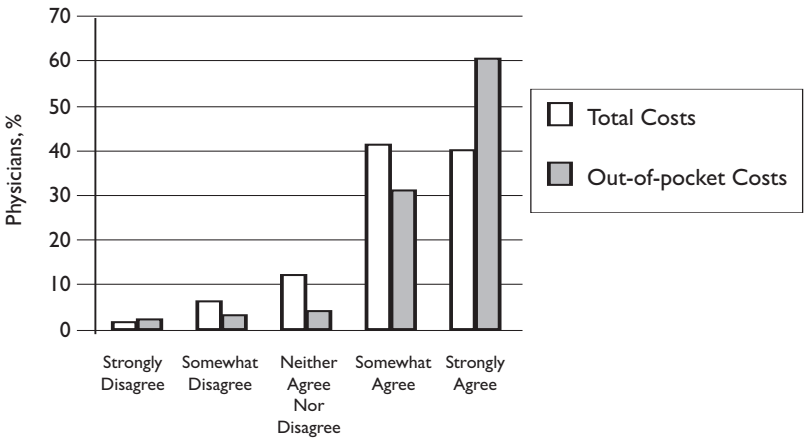
Few physician characteristics were associated with physicians' perceptions about which costs are relevant at the time of prescribing (**Table 3**). Physician age and sex were unrelated to the outcome; of physician specialties, only medical subspecialists were less likely to report that out-of-pocket costs were more important than generalists (odds ratio 0.56, $P = .046$). Physicians who managed more Medicare patients were more likely to report that out-of-pocket costs are more important than total costs. As an example of the magnitude of the effect, every 10-percentage-point increase in Medicare patient load was associated with approximately a 10% increase in the odds of reporting that management of out-of-pocket costs was more important ($P = .038$). No clear or consistent relationship patterns were seen between the number of formularies prescribed from, number of prescriptions written, practice location, or practice size. No significant relationship was found between physicians who used certain information technology tools (eg, computer order entry or handheld devices) and physician preferences about relevant costs.

DISCUSSION

Our survey of California physicians offers insight into the cost information that physicians consider most important when prescribing. Although physicians attempt to minimize both out-of-pocket costs and total costs of medication when choosing between equally effective and safe options, most believe that management of patients' out-of-pocket costs was more impor-

tant. These findings are instructive in the setting of the widespread implementation of tiered, incentive-based pharmacy benefit designs, which rely on varying out-of-pocket costs as a mechanism to influence physician prescribing and manage drug costs. When using incentive-based pharmacy benefit designs to align the patient's financial incentives with those of the insurer, efforts to educate physicians about patients' out-of-pocket costs will likely be a more effective mechanism to control prescription drug costs than efforts to educate physicians about the total costs of medication.

Figure. Percentage of Physicians Who Agreed That It Is Important to Manage Out-of-pocket and Total Costs of Medications



Physicians who managed more patients enrolled in Medicare expressed greater concern about out-of-pocket cost management. At the time of the survey, approximately one third of Medicare enrollees had no prescription drug coverage.[17] Although the passage of Medicare Part D provided additional coverage to many elderly people, the broad use of tiered formularies and lack of coverage in the "donut hole" will leave the elderly who enroll exposed to substantial out-of-pocket costs.[18] In addition, medical subspecialists were less concerned with patients' out-of-pocket costs as compared with total medication costs, suggesting that incentive-based formularies may be least effective in influencing prescribing among this physician population. Yet the most notable findings in our multivariate analysis were that very few physician or practice variables significantly influenced beliefs about relevant costs for prescription drugs, and California physicians believed that out-of-pocket costs were more important to manage than total medication costs.

Unfortunately, the financial incentives of patients and insurers are frequently discordant in tiered formularies. A recent article by Neumann and colleagues evaluating the cost effectiveness of preferred formulary medications in Florida Medicaid and a large managed care organization found that few drugs had any cost-utility data available, and of the drugs that did, most preferred drugs were "more costly and less effective than alternatives."[19] These inconsistencies highlight the challenges that physicians face when attempting to prescribe, as efforts to minimize out-of-pocket costs may conflict with efforts to manage total medication costs. When faced with conflicts in which prescriptions that minimize a patient's out-of-pocket cost will lead to increased total medication costs (or vice versa), our study suggests that physicians are more likely to choose medications that minimize patients' out-of-pocket costs, contributing to the rising overall costs of prescription

Table 2. Physicians' Responses (%) to Questions Addressing Patients' Out-of-pocket Costs and Total Costs of Medications

	Important to Discuss Out-of-pocket Costs With Patients	Important to Discuss Total Costs With Patients	Frequency of Discussing Out-of-pocket Costs With Patients	Frequency of Discussing Total Costs With Patients	
Strongly disagree	5	8	18	30	Never
Somewhat disagree	8	15	27	35	Seldom
Neither agree nor disagree	20	30	39	30	Some of the time
Somewhat agree	44	33	13	5	Most of the time
Strongly agree	21	14	2	0	Always

Some columns do not add to 100% due to rounding to the nearest integer.

Table 3. Factors Influencing Whether Physicians Agree That It Is More Important to Manage Patients' Out-of-Pocket Costs Than Total Medication Costs

	Odds Ratio	95% Lower Confidence Interval	95% Upper Confidence Interval	*P*
Intercept	0.95	0.18	5.12	.95
Physician age	0.99	0.97	1.02	.57
Male physician	1.34	0.82	2.21	.25
Number of prescriptions	1.00	0.99	1.00	.26
Systems use when prescribing				
Use handheld device	0.99	0.83	1.18	.92
Use Internet	0.87	0.68	1.11	.26
Use handbooks	0.91	0.74	1.12	.35
Computer order entry when prescribing	1.21	0.67	2.19	.53
Academic physician (yes)	1.28	0.71	2.31	.42
Practice in county facility (yes)	0.76	0.31	1.84	.54
Hospital-based practice	1.26	0.81	1.96	.30
Practice size				
Medium-sized practice*	1.70	1.01	2.88	.048‖
Large-sized practice*	0.98	0.48	2.00	.97
Very large-sized practice*	0.75	0.34	1.68	.48
Practice location				
Urban practice†	1.80	0.77	4.20	.17
Suburban practice†	2.00	0.89	4.46	.09
Percentage of patients insured by				
Medicare	1.01	1.01	1.02	.038‖
Uninsured	1.00	0.99	1.01	.92
Number of formularies prescribed from				
2 to 5‡	2.96	1.44	6.09	.003‖
6+‡	1.38	0.73	2.60	.32
"Don't know"‡	1.26	0.70	2.25	.44
Physician specialty				
Medical subspecialist§	0.56	0.32	0.99	.046‖
Surgeon§	0.64	0.34	1.20	.16
Ob-Gyn§	1.68	0.80	3.56	.17
Emergency room§	0.44	0.19	1.05	.07
Psychiatrist§	1.20	0.35	4.09	.78

Results of multivariate logistic regression after multiple imputation of missing variables.
Reference categories: *Solo/small practice, †rural practice, ‡0-1 formulary, §generalist/primary care physician.
‖$P < .05$.

drug care. Nonetheless, in most cases, less expensive drugs are selected as preferred on patients' formularies, and physicians who are aware of patients' preferred formulary options may prescribe the medication that conserves both patient and insurer resources.

Our findings offer critical insight into physician prescribing behavior that may be instrumental to insurers who attempt to design efficient pharmacy benefit structures to manage costs while maximizing quality. Previous studies have demonstrated that when branded drugs become available over-the-counter (OTC), costs for the insurer decrease.[20,21] However, more recent studies have found that insurers' coverage decisions influence costs; insurers who decreased coverage of OTC medications experience increased overall costs, whereas insurers who provide coverage for the OTC medication experience reduced overall costs.[22,23] These findings may be due, in part, to physicians' willingness to prescribe more expensive medications for patients whose insurance coverage allows them to access the medication for lower out-of-pocket costs. These findings suggest that as medications become available OTC, coverage decisions should consider both the total costs of the medication and the out-of-pocket costs so that the incentives of the insurer, patient, and society are aligned.

Our study was limited by the fact that we surveyed only physicians from California who are members of the CMA. Physicians from California may have different perceptions about drug costs than physicians elsewhere. Staff-model HMOs comprise substantial market share in California, and a large percentage of physicians in our sample prescribed from either 0 or 1 formulary. In addition, only approximately one third of the physicians in California are members of the CMA,[24] and the possibility exists that CMA members differ in some way from nonmembers. Further study in a national sample would be informative. Another study limitation was that just under half of the physicians surveyed responded to the survey, which may have introduced selection bias. Yet our nonresponder survey suggested that the respondents were similar to the nonrespondents, and our results were robust to the inclusion of the nonresponders.

These findings offer additional guidance concerning formulary design. Tiered formularies seem to address the costs that are most likely to influence physician and patient behavior, and present a logical approach to managing prescription drug costs. However, efforts are necessary to develop formularies in which decisions to select specific medications as preferred are more transparent and easily accessible. Although previous studies have found that doctors and patients discuss patients' out-of-pocket costs infrequently,[12,25] no previous study has differentiated communication about out-of-pocket and total costs for medications. We found that communication about total costs occurs even less frequently than discussions about out-of-pocket costs. If we aspire to create a collaborative healthcare system in which patients and physicians make decisions about care together, any conflicts should be eliminated between therapies that minimize out-of-pocket costs while increasing total costs (or vice versa) so that doctors and patients can engage in discussions about costs that are more easily comprehensible. Such simplification may require formulary decisions to be based on cost-effectiveness evidence about medications. There has been a growing interest in linking out-of-pocket costs to the expected benefits of a drug.[26] Such a benefit-based or value-based approach to formulary design may offer the most transparent mechanism for helping doctors and patients to communicate about costs and benefits of medications and lead to more cost-effective decision making.

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