Factors That Influence Patient Response to Requests to Change to a Unified Restrictive Formulary

A Prospective Study

Gerald W. Smetana, MD, Roger B. Davis, ScD, Russell S. Phillips, MD

OBJECTIVE: To determine factors that influence patient willingness to accept a medication change to a unified, restrictive formulary.

DESIGN: Prospective cohort study.

SETTING: University-affiliated hospital-based primary care internal medicine practice.

PATIENTS/PARTICIPANTS: Two hundred ninety-seven members of a managed care plan who had received a prescription for a nonformulary medication in the previous 4 months and whose primary care physician approved a conversion to a formulary medication.

INTERVENTIONS: Clinical nurses invited patients to change to a formulary medication at the time of a telephone refill request based on a standard script.

MEASUREMENTS AND MAIN RESULTS: The overall conversion rate to the formulary medication was 59.8%. Seventy-four percent of patients who requested a refill by telephone converted to the formulary (odds ratio [OR], 2.24; 95% confidence interval [CI], 1.02 to 4.72). Patient age (OR, 1.03; CI, 1.01 to 1.05) and male gender (OR, 2.00; CI, 1.09 to 3.67) were each significant correlates of conversion. After adjustment in a multivariable model, only telephone refill request (adjusted OR, 2.31; CI, 1.07 to 4.97) and age (adjusted OR, 1.03; CI, 1.01 to 1.06) remained significant. Among the patients who made a telephone refill request, those who converted were more likely to completely trust their physician's judgment ($P = .04$) and to trust their physician to put their health over cost concerns ($P = .05$). Formulary conversion reduced costs beginning 3 months after the conversion date.

CONCLUSIONS: A protocol for encouraging conversion to a unified formulary at the point of a telephone refill request increases formulary compliance rates and reduces medication costs. Patients who decline to convert medications are less likely to trust their physician.

KEY WORDS: formulary; managed care; drug costs; patient preferences.

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Over the past 2 decades, prescription drug costs have comprised an increasing share of total health care expenditures in the United States. From 1980 to 2000,

prescription drug expenditures increased from \$12.0 billion to \$122 billion annually; the proportion of total national health expenditures attributable to prescription drugs over the same time period increased from 4.9% to 9.4%.¹ The rate of rise of prescription costs continues to increase. In 2000, prescription drug expenditures grew at an annual rate of 17.3% while total health care costs increased by only 6.9%. This trend has continued through 2003 with the result that, in many markets, pharmacy costs in managed care plans now equal or exceed inpatient expenditures.

The rise in pharmacy costs over the past decade is due both to an increasing number of prescriptions and an increase in cost per prescription. In a 2001 National Institute for Health Care Management report, factors that contributed to the rise in pharmacy costs included an increase in the number of prescriptions (39% of total cost increase), price increases among existing drugs (37%), and a shift to higher cost drugs (24%).²

Many managed care insurers and physician organizations have responded by the development of restrictive formularies that reduce costs by excluding medications when a lower cost medication exists that is comparable in terms of safety and efficacy. In addition, formularies can help purchasers negotiate discounted prices by shifting market share between agents. In October 1998, the pharmacy and therapeutics committee of our integrated delivery system developed a unified outpatient drug formulary for use by member physicians. The principal factors that influenced the selection of drugs within each class were efficacy, safety, and cost. When two medications within a class were believed to be equivalent in terms of efficacy and safety, based on available evidence, the committee selected the lower cost agent.

Little is known about patient response to requests to change to a formulary medication for the purpose of controlling pharmacy expenditures. Will such requests engender suspicion or will patients understand and accept the request? Does a patient's trust in his or her physician or belief in the value of managed care as a tool to reduce medical costs influence willingness to accept a new formulary medication? We initiated a program to convert existing prescriptions to lower cost formulary agents and designed this prospective study to examine patient and physician factors associated with patient acceptance of such requests. As secondary goals, we sought to determine the cost associated with conversion and to develop a model for improved use of a unified formulary. As our intervention opportunity, we developed and studied a model where patients were offered a new formulary medication prescription at the time

Received from the Division of General Medicine and Primary Care, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, Mass.

Address correspondence and requests for reprints to Dr. Smetana: Division of General Medicine and Primary Care, Beth Israel Deaconess Medical Center, 330 Brookline Avenue, Boston, MA 02215 (e-mail: gsmetana@bidmc.harvard.edu).

of a telephone refill request for their previous nonformulary medication.

METHODS

Description of Site

We performed this study in Healthcare Associates, the hospital-based internal medicine teaching practice of Beth Israel Deaconess Medical Center and largest practice in the institution. At the time of this study, from October 1999 through October 2000, 24 faculty physicians and 100 resident physicians provided care for 22,000 patients who accounted for 65,000 annual primary care office visits. Six thousand patients (27% of our total panel) belonged to risk-based managed care commercial (non-Medicare) insurance plans. Healthcare Associates uses an electronic medical record that includes progress notes, medication lists, and medical problem lists. Clinicians write prescriptions directly from the electronic medication list. Clinical nurses respond to all telephone requests for medication refills in our practice.

Patient Sample

Using claims data from our 3 risk-based, capitated commercial insurance plans, we prepared primary care physician (PCP)-specific reports that listed all claims for nonformulary medications in the previous 4 months (Fig. 1). The claims reports included prescriptions written both by the PCP and specialist physicians caring for each individual patient. These reports included a total of 949 patients. We mailed copies of these reports to each PCP. Each PCP indicated his or her approval or nonapproval to convert the particular nonformulary medication at the time of the patient's next telephone refill request. We did not require PCPs to indicate the reason for their decisions. Patients were eligible for our study ($n = 297$) if their PCP indicated approval of the proposed formulary conversion.

Study Design

When more than one formulary alternative existed, the PCP indicated their preferred formulary agent. PCPs could also indicate, based on their discretion, a preference to have the patient return after a requested time interval for an office visit or laboratory tests to monitor the outcome of the formulary change. A clinical nurse reviewed all completed PCP reports, modified the medication list to indicate that the patient should be offered the new formulary medication at the time of the next telephone refill request, and wrote a brief progress note to confirm physician approval of the proposed change. Nurses reviewed the electronic medical record at the time of each refill request to identify eligible patients, obtained verbal informed consent to participate in the study, and read a standard script that indicated the preference of their PCP to switch the patient to the new formulary medication.

FIGURE 1. Flow chart for patient enrollment and data collection.

Initial Questionnaire

All patients who telephoned for a refill request, including those who refused to accept the formulary change, were invited to respond to a telephone questionnaire at the time of their request. This nurse asked questions about the duration of care with the current PCP, duration of participation in a managed care plan, duration of use of the nonformulary medication, and the importance of particular beliefs in the decision to accept or decline the medication conversion. For particular beliefs, we asked patients to respond as to whether the belief was very important, important, somewhat important, or not at all important.

Telephone Survey

We subsequently contacted all patients 3 to 6 months after the date of their refill request. At that time, we invited each patient to participate in a more detailed telephone interview, according to a standard script, designed to obtain additional demographic data and to determine, for patients who did change medications, medication side effects, efficacy, and whether the patient changed back to the previous nonformulary medication. For all patients, as

a measure of patient trust in their physician, we asked 4 questions from a validated instrument³ in addition to a question related to patients' beliefs about the use of less expensive medications to reduce the cost of health insurance. Potential responses included completely, mostly, somewhat, a little, or not at all.

Chart Review

We performed a chart review for all eligible patients. This review included all patients whose PCP had indicated approval of the proposed conversion. We collected information on the number of office visits, telephone calls, and laboratory tests during 6 months after the refill request (or after the beginning date for the study for patients who did not request a refill). We identified medication side effects both by direct telephone survey for the subset of patients who telephoned for a refill request, and by chart review for all patients.

During the study period, our integrated delivery system conducted educational efforts to inform physicians of preferred formulary medications within each drug class and to encourage conversion of medications to the formulary when possible. The Beth Israel Deaconess Committee on Clinical Investigations approved the study design.

Cost Analysis

We used reimbursement rates to estimate the financial costs associated with the conversion itself. We estimated the costs of additional office visits by use of the 2002 Medicare reimbursement schedule. We obtained reimbursement schedules for our 3 risk-based managed care plans from our integrated delivery system leadership for the same year and calculated the mean managed care reimbursement rates as a percentage of Medicare rates. We obtained mean managed care reimbursement rates for complete blood counts, lipid profiles, electrolytes, blood urea nitrogen, creatinine, and liver function tests from our institution's laboratory database. We used the average actual costs for formulary and nonformulary medications when calculating the cost savings associated with conversion to the formulary.

Data Management and Analysis

We performed statistical calculations using SAS statistical software, version 8.1 for Windows (SAS Institute, Cary, NC) and the FEXACT program.⁴ In 14 instances, a single patient was eligible based on more than one nonformulary medication. When this occurred, we randomly selected one medication for inclusion in the analysis.

To compare groups, we used Wilcoxon rank sum tests for ordinal data and Fisher exact tests for categorical data. We fit logistic regression models to assess the associations between patient and physician factors and willingness to

change to the formulary medication. We used a backward elimination algorithm to identify independent correlates. We reported odds ratios (OR) and associated 95% confidence intervals (CI) from these models.

RESULTS

Overall Conversion Rates and Patient Demographics

We enrolled a total of 297 patients whose PCP had approved the proposed medication change. Sixty-eight patients neither requested a refill nor received a prescription for either the nonformulary or formulary medication during the study period. In 8 cases, the original nonformulary medication was for a self-limited problem; in the other 60 instances, the patient never requested a refill from the PCP or a specialist during the study period. We excluded these patients from further analysis, 19.1% of whom were male with a mean age of 38.0 years. The remaining 229 patients are the subjects of this study. The mean age for these 229 patients was 42.3 years and 30.1% were male. The overall rate of conversion to the formulary medication was 59.8% (137 patients). Among patients who converted to the formulary medication, 32 did so at the time of a telephone refill request, 86 at a PCP or nurse practitioner office visit, 7 by telephone or letter, and 4 by a specialist physician.

The subset of patients who made a telephone refill request ($n = 43$) were predominantly white (64%), had very good or excellent self-reported health status (75%), had completed college or postgraduate education (74%), were employed (87%), and had an annual income of greater than \$60,000 (68%). Corresponding demographic data were not available for patients who requested a refill in another setting.

Patient Factors Associated with Conversion to the Formulary Medication

Patients who requested a refill by telephone were more likely to convert to the formulary medication than those who requested a refill in another setting (Table 1); the conversion rates were 74% and 56%, respectively ($P = .04$). In a subgroup analysis of specific medication categories, this difference was explained primarily by the difference between conversion rates for the two groups among users of oral contraceptives ($n = 84$); the conversion rates were 76% and 45%, respectively ($P = .03$). We found heterogeneity of formulary conversion rates among different medication classes as determined by an exact test of independence ($P = .0005$). Fewer patients agreed to convert antidepressants (23%) than any other class of medication.

We determined the influence of patient factors on formulary conversion rates (Table 2). Patient age, gender, and a telephone refill request (as opposed to a request during an office visit or another setting) each influenced

Table 1. Demographic Characteristics and Formulary Conversion Rates for Patients Who Requested a Medication Refill During Study Period (N = 229)

Characteristic	Telephone Refill Request	Refill Requested in Other Setting	P Value
Number of patients	43	186	
Mean age, y	40.2	42.8	.24
Male gender (%)	13 (30)	56 (30)	1.00
Membership in particular managed care insurance plan, %			
Plan A	35	33	
Plan B	28	16	.14
Plan C	37	51	
Medications converted to formulary (number converted/number refills requested) (%)			
All	32/43 (74)	105/186 (56)	.04
Antibiotics		1/3 (33)	
Antidepressant	0/1 (0)	3/12 (25)	1.00
Allergy medication	11/15 (73)	25/31 (81)	.71
Asthma inhalers		4/7 (57)	
Antihyperlipidemic	1/1 (100)	8/11 (73)	1.00
Antihypertensives	7/8 (88)	22/29 (76)	.66
Dermatologic	0/1 (0)	5/13 (38)	1.00
Gastrointestinal		2/3 (67)	
NSAIDs		2/4 (50)	
Oral contraceptives	13/17 (76)	30/67 (45)	.03
Sleep meds/anxiolytics		3/6 (50)	

NSAIDs, nonsteroidal anti-inflammatory drugs.

conversion rates. In an unadjusted analysis, a telephone refill request was the single strongest correlate of conversion (odds ratio, 2.24; 95% confidence interval, 1.07 to 4.72). The odds of converting to the formulary medication for men were twice those for women. Mean patient age was 4.8 years higher for those who converted to the formulary than for those who did not convert.

Among the subset of patients who telephoned for a refill request during the study period ($n = 43$), no significant differences existed in mean age, gender, or race. Patients who agreed to convert to the formulary medication, when compared to nonconverters, showed nonsignificant trends toward better self-reported health status (83% vs 55% excellent or very good, respectively), higher annual household income (73% vs 50% reported > \$60,000, respectively), and fewer years in a managed care plan (56% vs 43% reported < 5 years, respectively). The duration of care with the current PCP was similar for patients who converted and those who did not convert to the formulary; the most common response was 1 to 5 years for each group. The power to detect differences in these analyses was limited by the small sample size.

Physician Factors

Of the 24 participating physicians, 17 were male, the mean age was 42.7 years (50% were aged 40 to 49 years), and 13 had managed care patient panels greater than 150

patients. The mean managed care patient panel size per physician was 165 patients. No identified physician factors influenced formulary conversion rates (Table 2).

Multivariable Analysis

In a multivariable logistic regression analysis of patient and physician factors, only a patient telephone refill request (adjusted OR, 2.31; CI, 1.07 to 4.97; $P = .03$) and patient age (adjusted OR, 1.03 per year; CI, 1.01 to 1.06; $P = .005$) remained as significant correlates of formulary conversion. The conversion rates across decades of patient age ranged from 49.0% for patients under 30 years of age to 77.8% for patients 60 years of age or older. Patient gender was not significant in the multivariable analysis.

Financial Cost of Conversion

We estimated the financial cost of the formulary conversion by determining the total number of primary care office visits and laboratory tests for the 6 months after the conversion, and for an equivalent time period for patients who did not convert the medication (Table 3). The average number of office visits was greater for converters (1.60 vs 1.10; $P = .01$) than for nonconverters. Assuming that the average billing level for these visits was of moderate complexity (follow-up office visit, level 4, CPT code 99214), actual costs (rather than charges), based on the Medicare reimbursement schedule (\$89 per visit), and mean managed care insurance reimbursements of 93% of Medicare rates would be \$41 higher for patients who converted to the formulary.

The average number of laboratory tests was twice as great for converters than nonconverters (3.00 vs 1.48; $P = .001$). This difference was fully explained by higher rates of complete blood counts, electrolytes, renal function, and lipid testing. After determining the reimbursement rates for each of these tests, and adjusting for the managed care plan reimbursement schedules, the actual cost of these excess tests averaged \$41 per patient who converted the medication to the formulary.

During the study period, the average cost to our integrated delivery system for a formulary medication was \$43 per month and that of a nonformulary medication was \$70 per month. Taking into account the cost of the conversion process (\$82), the strategy of formulary conversion resulted in cost savings beginning at 3 months after conversion.

Patient Beliefs and Medication Change

We determined the importance of particular factors in making a decision to accept or decline the proposed formulary conversion (Table 4) for the subset of patients who telephoned for a refill request and agreed to answer a questionnaire ($n = 32$). For the 25 patients who accepted the conversion, all patients trusted their physician's judgment, and 96% reported that it was important to change medications in order to keep health care costs affordable.

Table 2. Univariate Analysis of the Influence of Patient and Physician Factors on Formulary Conversion Rates (N = 229)

	Frequency of Factor Among Patients Who Converted Medication (n = 137)	Frequency of Factor Among Patients Who Did Not Convert Medication (n = 92)	P Value	Unadjusted Odds Ratio (95% CI)
Patient factors				
Mean age, y	44.2	39.4	.007	1.03 (1.01 to 1.05) per year
Male gender (%)	49 (36)	20 (22)	.02	2.00 (1.09 to 3.67)
Insurance plan (%)			.10	
Plan A	42 (31)	34 (37)		1.00
Plan B	21 (15)	21 (23)		1.62 (0.89 to 2.95)
Plan C	74 (54)	37 (40)		0.81 (0.38 to 1.72)
Telephoned for refill request (%)	32 (23)	11 (12)	.03	2.24 (1.07 to 4.72)
Physician factors				
Male gender (%)	94 (70)	61 (66)	.60	1.16 (0.66 to 2.05)
Age, y (%)			.07	
30 to 39	40 (30)	19 (21)		0.98 (0.42 to 2.30)
40 to 49	67 (50)	60 (65)		0.52 (0.25 to 1.09)
≥50	28 (21)	13 (14)		1.00
Managed care panel >150 patients (%)	102 (76)	67 (73)	.64	1.15 (0.63 to 2.11)
Managed care panel ≤150 patients (%)	33 (24)	25 (27)	.64	1.15 (0.63 to 2.11)

Fewer patients (36%) believed that insurers have the right to change medications if it saves them money. A minority of patients (24%) worried that their care might suffer if they did not accept their doctor's recommendation to change the medication. Among the 7 patients who declined to change their medication, all were concerned that the new medication would not work as well and that they may have side effects from the new medication; most indicated a belief that insurers should not dictate which medicines they take and that the change was being made to save money and was not good for them.

Patient trust in their physician was an important correlate of conversion (Table 5) among those who telephoned for a refill request and answered the questionnaire (n = 32). Patients who agreed to convert to the formulary medication, when compared to those who declined to convert, were more likely to completely trust their physician's judgment about their medical care (75% vs 33%, respectively; $P = .04$), and to completely trust that their physician would put their health and well-being above keeping down the health plan's cost (54% vs 12%, respectively; $P = .05$).

Medication Side Effects

Among the 32 patients for whom we have data from the second telephone interview, 5 patients reported side effects to the interviewer; in only 1 case was the side effect documented in the medical record. Three patients self-discontinued the new medication and subsequently changed back to the nonformulary medication. Among 105 patients who requested a refill in another setting (office visit, letter, specialist physician visit) and accepted the switch

to a formulary medication, 10 had physician-documented side effects by chart review, 9 self-discontinued the new medication, and 14 changed back to the nonformulary medication.

Barriers to Study Participation

We identified 149 patients who neither requested a refill by telephone nor converted to the formulary medication at any time during the study period. In 32 of these cases, the PCP continued to prescribe the nonformulary medication, despite educational efforts to increase awareness of the formulary. For 49 patients, a specialist physician prescribed the original nonformulary medication and the patient never requested a refill from the PCP.

DISCUSSION

We found that the overall rate of conversion to the formulary medication was 59.8% during the study period. This suggests that our education program for physicians at least partially achieved the desired result of improving compliance with the formulary to control costs. Among patients who telephoned for a refill request, the conversion rate was 74%; the conversion rate for patients who obtained a refill in another setting was 56%. A telephone refill request was the single strongest correlate of acceptance of formulary conversion in a multivariable analysis. This observation indicates that a model of suggesting a formulary conversion to patients at the time of a refill request may be a useful strategy to improve formulary compliance.

Among patient demographic factors, higher age and male gender were associated with increased likelihood of

Table 3. Primary Care Office Visits, Telephone Calls, and Laboratory Tests During the Six Months Following Proposed Formulary Change (N = 229)

	Converters (n = 137) Mean/Median (25th, 75th Percentile)	Nonconverters (n = 92) Mean/Median (25th, 75th Percentile)	P Value
Number of office visits	1.60/1 (1, 2)	1.10/1 (0, 2)	.01
Number of patient telephone calls	1.13/1 (0, 2)	1.12/1 (0, 2)	.89
Total number of laboratory tests	3.00/1 (0, 4)	1.48/0 (0, 2)	.001
Number of specific laboratory tests			
CBC	0.64/0 (0, 0)	0.22/0 (0, 0)	.14
Cholesterol or lipid profile	0.49/0 (0, 1)	0.21/0 (0, 0)	.0005
Electrolytes, BUN, or creatinine	0.64/0 (0, 1)	0.20/0 (0, 0)	.001
LFTs	0.39/0 (0, 1)	0.09/0 (0, 0)	.0001

CBC, complete blood count; BUN, blood urea nitrogen; LFT, liver function tests.

conversion; only age persisted as a significant factor after adjustment for confounders. Among the subset of patients who telephoned for a refill request, trends existed toward better self-reported health status, higher household income, and fewer years in a managed care plan for those who converted to the formulary medication. No physician characteristic influenced the likelihood that a patient would agree to a formulary conversion. This finding differs from our expectation that patients of physicians who cared for larger managed care panels would be more likely to convert to the formulary medication.

Patients who agreed to convert to the formulary trusted their physician's judgment and believed that it is important to keep health care costs affordable. Infrequently, patients agreed to change medications in part due to concern that their care may suffer if they did not accept the change. Patients who declined to change medications were concerned about the potential for side effects, the possibility that the new medication would be less effective, and believed that insurers should not dictate medication choices. We found that patient trust in their physician's judgment and motivation to place their health above cost concerns were significant predictors of acceptance of the formulary change.

The short-term financial cost of our formulary conversion program was small. Additional office visits and laboratory testing due to the formulary change resulted in only an \$82 increase in health care expenses. The strategy of formulary conversion resulted, on average, in cost savings beginning at 3 months after conversion.

Some managed care insurers, physician organizations, and hospitals have addressed rising medication costs by

Table 4. Importance of Particular Factors for Patient Acceptance or Refusal to Change to a Formulary Medication Among Patients Who Made a Telephone Refill Request (n = 34)

Reason*	Important n (%)†	Unimportant n (%)‡
Reasons for acceptance (n = 25)		
I trust my doctor's judgment	25 (100)	0 (0)
I believe it is important to keep health care costs affordable	24 (96)	1 (4)
I worry that my care might suffer if I don't accept my doctor's recommendation to change	6 (24)	19 (76)
I believe insurers have the right to change medications if it saves them money	9 (36)	16 (64)
Reasons for refusal (n = 7)		
I am happy with the current medication	7 (100)	0 (0)
I am concerned the new medication won't work as well	7 (100)	0 (0)
I am concerned I may have side effects from the new medication	7 (100)	0 (0)
I am concerned I may need additional tests and visits to monitor the new medication	3 (43)	4 (57)
I had side effects from the proposed new medicine in the past	2 (29)	5 (71)
I've never heard of the new medicine	3 (43)	4 (57)
I am concerned that this change is being made to save money and is not good for me	5 (71)	2 (29)
I don't believe insurers should dictate which medicines I take	6 (86)	1 (14)
I am concerned that my copayment may increase and the change will cost me more money	3 (43)	4 (57)
All patients (n = 34)	Yes	No
I would have been more comfortable with this change if I had discussed it with my doctor first (P = .61)		
Accepted conversion (n = 27)	13 (48)	14 (52)
Declined conversion (n = 7)	4 (57)	3 (43)

* Responses at time of telephone refill request.

† Combined responses for "very important" and "somewhat important."

‡ Combined responses for "somewhat unimportant" and "not at all important."

developing closed formularies. Schachtner et al. surveyed 463 hospitals and found that 88% of teaching hospitals, 89% of non-teaching hospitals, and 100% of investor-owned hospitals had developed therapeutic interchange programs to improve use of a restrictive formulary for inpatient medications.⁵ Such formularies have also been shown to reduce total prescription medication expenditures. Chiefari reported that after implementation of a restrictive formulary in a community health center, average costs per prescription fell from \$35.25 to \$26.25.⁶ Motheral and Henderson described the effect of a closed formulary on prescription drug costs for a government

Table 5. Influence of Patient Trust in Physician on Acceptance Rates Among Those Who Requested a Refill by Telephone (n = 33)

Question*	Agreed to Convert Medication (n = 24)	Declined to Convert Medication (n = 9)	P Value
	Number of Patients Who Responded "Completely" n (%)		
How much do you trust your physician's judgment about your medical care?	18 (75)	3 (33)	.04
How much do you trust your physician to refer you to a specialist when needed?	20 (83)	6 (67)	.36
How much do you trust your physician to offer you high-quality medical care?	21 (88)	6 (67)	.31
How much do you trust your physician to put your health and well-being above keeping down the health plan's cost?	13 (54)	1 (11)	.05
Do you believe that doctors should recommend less expensive medications of equal benefit and safety in order to minimize medication costs and the cost of health insurance?	13 (54) [†]	3 (33) [†]	.44

* Responses at time of follow-up telephone survey.

[†] Number (percent) of patients who responded "definitely yes."

employee group.⁷ During the 9-month period after institution of a closed formulary, total prescription costs decreased by 5%. Costs in a contemporaneous control group that did not have a closed formulary increased by 39% during the same time period. In another survey, Hazlet and Hu reported that hospitals that used a restrictive formulary and therapeutic interchange spent 13.4% less on medications than hospitals that used neither strategy.⁸

While restrictive formularies are prevalent and decrease medication costs, less is known about patient experiences with the formulary conversion process. Kleinman et al. surveyed 205 patients with gastroesophageal reflux disease requiring prescription medication who were cared for in specialty gastroenterology practices.⁹ Based on hypothetical treatment outcomes, subjects were willing to pay up to an additional \$182 per month to obtain complete symptom relief more quickly with no side effects. Another successful cost reduction strategy has been the development of two- or three-tiered copayment structures.¹⁰ Using a large administrative database for British Columbia, Schneeweiss et al. found no evidence for higher rates of self-discontinuation of treatment or long-term increase in health services utilization after institution of a policy to increase patient cost sharing for nonformulary angiotensin converting enzyme inhibitor medications.¹¹

In our study, trends existed toward lower acceptance of the formulary medication for patients taking antidepressant medications (23%) and higher rates for antihypertensive medications and lipid-lowering agents (78%). Hensley and Nurnberg reviewed the potential consequences of limiting a formulary to a single selective serotonin reuptake inhibitor (SSRI).¹² They estimated that patients who switch to the preferred formulary SSRI remain in treatment 50% longer and cost approximately 50% more to treat than

those who do not switch medication. Our observation, in conjunction with these findings, suggests that it may be prudent to exclude SSRIs from telephone protocols for enhancing formulary conversion.

The small sample size and resultant lack of power to identify differences between some groups is an important limitation of our study. In addition, we identified patients for this study from a single institution and it is unknown whether similar findings would exist among patients at community hospitals, nonacademic practices, and urban public hospitals. Our study was restricted to patients in commercial (non-Medicare) risk-based insurance plans due to the nature of our available claims database. While it is likely that preferences of patients in other insurance plans, Medicaid, and Medicare would be similar, we cannot establish this by our study. Finally, although we found that a telephone refill request is an important opportunity to change to a formulary medication, it is possible that this relates to clinical or nonclinical factors that we were unable to adjust for in our analysis.

We suggest future research in this area that includes studies with larger sample sizes, practices that use paper-based rather than electronic medical records, different practice settings, and Medicaid and Medicare enrollees. Such studies should also examine patient understanding of health care costs (including medication, provider, and facility costs), and the influence of patients' understanding of costs on medical decision making.

We conclude that a strategy of physician education and a telephone refill-based protocol to encourage conversion to a unified selective formulary successfully improves formulary compliance and reduces pharmacy costs. Intervention at the point of a telephone refill request increases formulary conversion rates and is the strongest factor

associated with conversion. Based on our observations, older age and male gender increase the likelihood of patient acceptance of conversion; physician factors do not influence conversion rates. Patients who decline to convert to the formulary are less likely to trust their physician's judgment and priorities, and are more likely to believe that insurers should not dictate medication choices or select medications based on cost considerations.

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