Effects of Patient Medication Requests on Physician Prescribing Behavior

Results of A Factorial Experiment

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Background: Because of internet searches, advice from friends, and pharmaceutical advertising, especially direct-to-consumer advertising, patients are increasingly activated to request medications during a physician encounter.

Objectives: To estimate the effect of patient requests for medications on physician-prescribing behavior, unconfounded by patient, physician, and practice-setting factors.

Research Design: Two experiments were conducted among 192 primary care physicians, each using different video-based scenarios: an undiagnosed "patient" with symptoms strongly suggesting sciatica, and a "patient" with already diagnosed chronic knee osteoarthritis. Half of patients with sciatica symptoms requested oxycodone, whereas the other half requested something to help with pain. Similarly, half of knee osteoarthritis patients specifically requested celebrex and half requested something to help with pain.

Subjects: To increase generalizability and ensure sufficient numbers were available, we recruited 192 primary care physicians from 6 US states.

Measures: The primary outcome was whether physicians would accede to a patient's request for a medication. Alternative pain medications prescribed were secondary outcomes.

Results: 19.8% of sciatica patients requesting oxycodone would receive a prescription for oxycodone, compared with 1% of those making no specific request ($P = 0.001$). Fifty-three percent of knee osteoarthritis patients requesting celebrex would receive it, compared with 24% of patients making no request ($P = 0.001$). Patients requesting oxycodone were more likely to receive a strong narcotic ($P = 0.001$) and less likely to receive a weak narcotic ($P = 0.01$). Patients requesting celebrex were much less likely to receive a nonselective nonsteroidal anti-inflammatory drugs ($P = 0.008$). No patient attributes, physician, or organizational factors influenced a physician's willingness to accede to a patient's medication request.

Conclusions: In both scenarios, activated patient requests for a medication substantially affected physician-prescribing decisions, despite the drawbacks of the requested medications.

Key Words: direct to consumer, patient activation, disparities

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Decisions about whether to prescribe a medication, and which medication to prescribe, were traditionally made by physicians, with patients assuming a more passive role. This has changed dramatically in recent decades as patients have become more active participants in their medical care. Activated patients are more likely to come to a clinical encounter with a desired therapeutic plan already in mind, such as a prescription for a specific agent.[1,2] However, it is not well understood how large an impact these requests have on physician-prescribing decisions, and whether such impacts are modified by patient and physician characteristics, or by organizational factors.

Patient activation arises from multiple sources including media reports, advertising, internet searches, or word of mouth. An increasing source of patient activation distinctive to the United States (and New Zealand) is direct-to-consumer advertising (DTCA) of medications.[3] Since 1997, when the Food and Drug Administration began allowing DTCA, marketing of pharmaceuticals has increasingly focused on patients rather than physicians.[4,5] DTCA prompts consumers to talk with their doctors about medications they have seen advertised: 30% of Americans indicate they talk with their doctor about a medicine they saw advertised, of whom 44% report their doctor prescribed the medication requested.[6]

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Despite misgivings, many physicians accede to a patient's medication request.[7–9] Whether this varies by patient attributes (such as sex, race/ethnicity, and socioeconomic status), physician characteristics (such as sex and years of clinical experience), organizational or practice-setting influences remains poorly understood. Research to date is almost entirely observational—usually surveys of patients and physicians with respect to the outcome of a medication request.[10] Robust experimental methods are seldom employed to estimate the separate effects of patient, provider, and organizational influences on the success of medication requests, and little is known about which physicians are more likely to accede to or deny a patient's request and why.

This paper addresses the following 3 questions:

(1) How successful are patient requests for specific pain medications, and do such requests affect prescribing of other medications?
(2) Do either patient or physician characteristics influence the success of a medication request?
(3) Do organizational characteristics, features of a practice setting, or physician attitudes and opinions influence the response to a specific medication request?

METHODS

We conducted 2 balanced experiments using 2 clinically authentic video-based scenarios: an undiagnosed "patient" with symptoms strongly suggesting sciatica, and a "patient" presenting with already diagnosed chronic osteoarthritis of the knee (OA). Inserted in the presentation was either an active request for a particular medication or a passive request for pain relief in general. Half of the sciatica patients made a specific request for oxycodone, whereas half of the OA patients specifically requested celebrex. The phrasing of these requests was as follow:

The patient with sciatica: "*My wife/husband had some oxycodone left over from some dental surgery and I took one last night and … I mean, it really worked. I was amazed.*"

The patient with knee osteoarthritis: "*I've seen ads for Celebrex … A woman I work with takes it and she said it really works for her …*"

A total of 192 primary care physicians were recruited from 6 states (Illinois, Indiana, Missouri, Massachusetts, New Hampshire, and Rhode Island)—(a) to improve generalizability and (b) to ensure adequate numbers. We recruited subjects stratified according to sex and level of clinical experience and purposively recruited until each cell was complete.

Balanced Factorial Design

Two medical scenarios, both depicting active and passive patient prescription requests, were examined in separate experiments using the same factorial experimental design and the same physician subjects, providing an opportunity to test the robustness of study findings through replication. A factorial experimental design allows us to estimate the independent effects of factors and interactions between factors that may affect patient management decisions concerning medication requests. Altogether, we examined 6 main effects: 2 physician factors (sex, years in practice), and 4 patient factors (race/ethnicity, sex, socioeconomic status, and presentation style: active vs. passive request). The vignettes for each condition (sciatica and OA) were grouped in pairs (either assertive or passive) and presented together to physician participants. To minimize the influence of prior exposure, the respective "patients" within each pair represented different combinations of sex, race/ethnicity, SES, and presentation style. Mindful of the potential for biased responses because of priming, the active request was always shown second, rather than being randomized.

Each case was developed with input from clinically active physicians who regularly encounter patients with these conditions. On recommendation of these colleagues, several minor distractions were embedded in the presentation to increase the clinical authenticity of the scenario (Table 1). Scripts for the scenarios of interest were developed from tape-recorded role-playing sessions with experienced, clinically active physicians. Following their development, 2 clinical coauthors (J.N.K. and M.A.F.) along with 4 independent primary care physicians confirmed the accuracy of the clinical content and the realism of the presentations.

Six professional actors and actresses (male and female of each race/ethnicity) were recruited in New York City and directed (under physician supervision) to realistically portray a "patient" presenting to a primary care physician with symptoms of the 2 conditions. The same actor/actress portrayed 4 different patients: 2 presentation styles (active vs. passive medication request) and 2 levels of socioeconomic status (lower vs. higher social class—a truck driver vs. sales representative for sciatica; a janitor vs. a lawyer for OA; also expressed by style of dress). The sciatica vignette included driving as part of the patient's occupation—a relative contraindication to narcotics. Logistical and cost considerations precluded inclusion (as design variables) of other physician characteristics (such as race/ethnicity), which may influence

TABLE 1. The Content of Clinical Vignettes for OA and Sciatica

Diagnosis	Suggestive Symptoms	Distractions
OA of knee	Aching, constant pain in knee	Morning pain
	Much worse with weight bearing and better with sitting down	No response to Tylenol
	No mechanical symptoms (clicking, catching) to suggest meniscal tear	
	Increasing functional limitation (stairs, minutes walking)	
Sciatica	Pain in sciatica distribution—back, buttock, legs	Pain described as "fuzzy"
	Unilateral (just 1 leg)	Pain "controls my life"
	Neurogenic quality to pain—knife-like, stabbing, sharp, burning	
	Pain with coughing (Valsalva maneuver)	
	Worse with sitting and driving	
	Increasing functional limitation (stairs, walking, driving)	

OA indicates osteoarthritis of the knee.

their prescribing behavior. Filmed scenarios have advantages over the use of standardized patients and written scripts because they ensure standardization and permit inclusion of informative nonverbal indicators (eg, facial grimaces, shifting in discomfort, pointing to specific pain location), and they are now widely used in medical education and for credentialing purposes.[11] Each video-based encounter simulated an initial interview with a primary care physician and was of 5 to 7 minutes in duration, reflecting the average length of a consultation.[12] Differences between "patients" (by sex, race/ethnicity, and socioeconomic status) are illustrated in the supplementary digital content (Supplementary Figure, Supplemental Digital Content 1, http://links.lww.com/MLR/A673, which shows the same actor presenting as either a low-SES or high-SES "patient").

Sciatica and chronic knee osteoarthritis were selected for study because: (a) they are common problems presented by patients of both sexes and all races to primary care providers; (b) relatively few clinical decision making studies focus on the diagnosis and management of pain or the possible effects of DTCA; (c) the scenarios depicted permit a range of possible diagnostic, therapeutic, and lifestyle actions; (d) there is a recent increase in requests for analgesic medications for musculoskeletal conditions in the United States; and (e) a recent analysis of data from the Drug Enforcement Administration reveals that the use of pain medicine in the United States has increased by 88% between 1997 and 2005.[13]

Recruitment

To be eligible for selection, physicians had to: (a) have completed a medical residency program in either internal medicine or family practice; (b) be licensed to practice as a primary care physician; (c) have <20 years clinical experience (graduated between 1992 and 2002) or >20 years experience (graduated between 1970 and 1991) to ensure clear separation by level of experience; and (d) be currently providing clinical care at least half time. We focus on decision making at the level of primary care because: (a) it is where most patients with sciatica and osteoarthritis first present and receive an initial evaluation; (b) it largely influences the course of the disease and eventual patient outcomes; and (c) it is where up to 90% of all health care costs originate.[14,15] We employed purposive recruitment to equally fill 4 design cells (2 levels of sex by level of experience) and preserve orthogonality. Screening telephone calls were conducted to identify eligible subjects and an hour-long, in-person interview was scheduled. Each physician subject was provided a modest stipend ($200) to partially offset lost revenue and to tangibly acknowledge participation. Each subject signed and was provided a copy of informed consent, and all study procedures were approved by the NERI Institutional Review Board.

Study Outcomes

Immediately after viewing each vignette, physician subjects completed a semistructured interview concerning how they would manage the case, including what medications they would prescribe. The primary study outcome was whether the physician prescribed oxycodone for sciatica or celebrex for OA. Other medications prescribed were included as secondary outcomes of interest.

Analytic Approach

Altogether, $3 \times 2^2 = 12$ patient characteristic combinations were produced (race/ethnicity, sex, SES). Each combination was portrayed twice to accommodate the drug request, yielding 24 distinct vignettes for each condition. The 2 physician factors (sex, physician experience) define 4 strata. Within each stratum, 48 participants (physicians) were purposively sampled and randomly assigned to view one of the 24 pairs of vignettes. This constituted 2 replications of the design, for each prescription request in each stratum. The total sample of 192 physicians provided 80% power at level 0.05 to detect an absolute difference in means of 0.2 SDs. For example, if the rate of prescription of the requested drug was 0.25, we would have power to detect a difference in proportions of 0.09. For rates of prescriptions varying from 0.25 to 075, as observed for most outcomes in the passive request group, we had power to detect a difference in proportions of 0.09 to 0.10. Thus the study had adequate power to detect plausible effects of the medication request, as well as other predictors of interest. For 2-way interactions the sample also provided 80% power to detect a difference of 0.2 SDs.

The balanced factorial design, with no missing data, allows unconfounded estimation of all main effects and all interactions. In addressing all hypotheses, the analytic approach took the form of the analysis of variance (ANOVA) for a factorial experiment, including all main effects and interactions (all 2-way and higher order interactions) of the 4 patient and 2 physician design factors.[16] We report *P*-values from *F* tests using the type III sum of squares, after adjusting for all other main effects and interactions in the model. The main effect of patient request was used to address question #1, whereas the main effects of all other patient and physician characteristics as well as all interaction terms were used to address question #2. Two models were fit, one for each scenario (sciatica and OA).

Although logistic regression may be more technically appropriate for dichotomous variables, we choose to use ANOVA for several reasons: (1) because of data sparseness (2 replications of the 96 combinations of predictive factors), we cannot estimate the full model with logistic regression, whereas we can with ANOVA; (2) the 2 models are equivalent because of the Central Limit Theorem and empirical experience; (3) this Fisherian regression is equivalent to linear discriminant analysis[17]; and (4) analysis of variance allows for more straightforward interpretation of the estimation results when many interactions are included in the model. As we have 2 replicates, we can estimate σ^2 directly using the pure error term. It is preferable to use the calculated residual error, if available from the design as in this experiment, even if the higher order interaction terms are insignificant.[18] Moreover, by using the full model, no assumptions need to be made about higher order interactions.

As part of secondary analyses to address Question #3, the impact of many organizational characteristics and physicians' views of the practice setting were included as

covariates in analysis of the active request only: practice size, practice type, family practitioners versus internists, international medical school graduates, for/not-for-profit status, predominantly fee for service, income from salary and incentive payments, income dependent on productivity, satisfaction surveys, quality of care, allowing marketing visits, samples, promotional materials, or gifts from pharmaceutical companies, average number of patients per week, number of patients in panel, percentage patients in managed care plants, percentage patients reimbursed on a captivated or prepaid basis, and use of electronic medical records and practice culture. We also considered physician perceptions and opinions regarding the use and usefulness of clinical guidelines, pressure to keep patients happy frequency, frustration with medication requests from patients, opinions about patient involvement in decision making, perceived effect of loss of patients, responsibility for financial survival of the practice, worry about lawsuits, perceived administrative or bureaucratic constraints, perceived intrusion on clinical decisions, and work-life perceptions. Because of the challenges of multiple testing, we focus on identifying general patterns across both scenarios and comparing the number of significant effects to that which would be expected because of chance alone. We analyzed 44 covariates for 2 cases and would therefore expect, due to chance alone, 4 comparisons to be significant at the 0.05 level.

RESULTS

Table 2 summarizes the sociodemographic characteristics of the "patients" and physicians recruited for the experiment. The physicians were almost equally balanced between family practitioners and internists, and 34% of the subjects were international medical graduates.

19.8% of physicians reported that they would prescribe oxycodone (including combination medications containing oxycodone) for the sciatica patient after seeing a specific request for this agent, whereas only 1.0% (1 physician) would do so for the passive patients who make no specific request ($P < 0.001$). Over half (53%) of physicians viewing patients with OA of the knee who request celebrex report that they would prescribe it, compared with just 24% if no specific medication request is made ($P < 0.001$) (Supplementary Figure, Supplemental Digital Content 2, http://links.lww.com/MLR/A674, which shows physician-prescribing behavior by condition and patient request).

Table 3 summarizes results concerning the effect of a medication request on the prescribing of alternative pain medications. Physicians viewing patients with sciatica making a specific request for oxycodone were significantly more likely to choose a strong narcotic ($P < 0.001$) and much less likely to select a weak narcotic ($P = 0.01$) and showed a trend of being less likely to not select a narcotic ($P = 0.11$). When physicians saw patients presenting with OA specifically requesting celebrex, they were less likely to choose another nonsteroidal anti-inflammatory drugs (NSAID) ($P = 0.008$) or not prescribe an NSAID ($P = 0.004$) and were nonsignificantly less likely to choose a narcotic ($P = 0.11$).

TABLE 2. Patient and Physician Characteristics, N = 192

	N (%)
Patient	
Age*	~45 or 68[†]
Sex*	
Male	96 (50)
Female	96 (50)
Race*	
White	64 (33)
Black	64 (33)
Hispanic	64 (33)
SES*	
Lower	96 (50)
Upper	96 (50)
Medication request*	
Active	96 (50)
Passive	96 (50)
Physician subjects	
Age [mean (SD)]	49.4 (9.6)
Sex*	
Male	96 (50)
Female	96 (50)
Race	
White	106 (57.6)
African American	14 (7.6)
Asian	47 (25.5)
Other	17 (9.2)
Ethnicity	
Hispanic	11 (5.9)
Not Hispanic	175 (94.1)
Experience*	
< 20 y	96 (50)
> 20 y	96 (50)
Practice type	
Family practitioner	95 (49)
Internist	86 (45)
General practitioner	11 (6)
International medical graduate	
Yes	63 (34)
No	123 (66)

*By balanced factorial study design.
[†]Mid-40s for sciatica; late-60s for osteoarthritis.

Table 4 presents results of the effects of patient attributes and provider characteristics on physician willingness to accede to a patient medication request. None of these patient or provider influences had any influence on physician willingness to accede to a patient request. A patient request for a specific medication by itself influences the outcome, irrespective of the 3 patient attributes and 2 physician characteristics included in our research design. Although physician subjects encountered one active request and one passive presentation (no request), there is consistency across the 2 conditions.

The effect of physicians' workplace, perceptions, and opinions are presented in the supplementary digital content (Supplementary Table, Supplemental Digital Content 3, http://links.lww.com/MLR/A675, which shows prescription of oxycodone for sciatica and celebrex for osteoarthritis by features of the workplace; and Supplementary Table, Supplemental Digital Content 4, http://links.lww.com/MLR/A676, which shows prescription of oxycodone for sciatica and celebrex for osteoarthritis by physician perceptions and

TABLE 3. Prescription Received by Patient Request

	n (%)		
	Active	**Passive**	***P****
Sciatica			
Oxycodone	19 (19.8)	1 (1.0)	**<0.001**
Strong narcotic[†]	54 (56.2)	29 (30.2)	**<0.001**
Weak narcotic[‡]	12 (12.5)	25 (26.0)	**0.01**
NSAID	54 (56.2)	62 (64.6)	0.21
No narcotic	33 (34)	43 (45)	0.11
Osteoarthritis			
Celebrex	51 (53.1)	23 (24.0)	**<0.001**
Narcotic	29 (30.2)	39 (40.6)	0.11
Nonselective NSAID	32 (33.3)	49 (51.0)	**0.008**
No NSAID	17 (17.7)	33 (34.4)	**0.004**

*N (%) are from raw data; *P*-value from ANOVA for a balanced factorial experiment, including all 2-way and higher order interactions; physicians could prescribe >1 drug.

[†]Hydrocodone, oxycodone, vicoprofen, roxicet, percocet.

[‡]Codeine, tramadol, ultracet, propoxyphene napsylate.

Values in bold indicate $P > 0.05$ are statistically significant.

ANOVA indicates analysis of variance; NSAID, nonsteroidal anti-inflammatory drugs.

opinions). Of the 44 features considered as covariates, only 5 appeared significantly related to a physician's willingness to accede to patient medication requests, none of which were consistent across the 2 scenarios. If the physicians income was dependent on measures of quality of care ($P = 0.03$) or the physician saw higher numbers of patients per week ($P = 0.03$), they were more likely to grant the patient's request. Physicians were less likely to accede if they felt personally responsible for the financial survival of their practice ($P = 0.05$), if they perceived administrative intrusions on clinical decisions ($P = 0.05$), and if they thought they were inadequately compensated ($P = 0.01$). Although these influences are statistically significant at level 0.05 and are plausible, they could also be due to chance alone, especially given the lack of *P*-values considerably <0.05.

TABLE 4. Prescription of Oxycodone for Sciatica and Celebrex for Osteoarthritis by Patient and Provider Characteristics

	Oxycodone		Celebrex	
	N (%)	***P****	**N (%)**	***P****
Patient sex		0.62		0.33
Male	9 (9.4)		34 (35.4)	
Female	11 (11.5)		40 (41.7)	
Patient race		0.31		0.83
White	7 (10.9)		26 (40.6)	
Black	9 (14.1)		25 (39.1)	
Hispanic	4 (6.3)		23 (35.9)	
Patient SES		0.14		0.33
Lower	7 (7.3)		34 (35.4)	
Upper	13 (13.5)		40 (41.7)	
Provider sex		0.14		0.52
Male	13 (13.5)		39 (40.6)	
Female	7 (7.3)		35 (36.5)	
Provider experience		0.62		0.20
<20 y	9 (9.4)		41 (42.7)	
≥20 y	11 (11.5)		33 (34.4)	

*N (%) are from raw data; *P*-value from analysis of variance (ANOVA) for a balanced factorial experiment, including all 2-way and higher order interactions.

CONCLUSIONS

Results from this factorial experiment reveal that a patient request for a specific medication dramatically increases the rate at which physicians prescribe that medication. The success of patient requests was consistent across both of the pain conditions separately presented sciatica and OA of the knee. For both conditions, the patient request tended to drive the choice of prescriptions within the relevant class of medications; narcotic requests moved prescribing from weaker narcotics to stronger narcotics and celecoxib requests increased overall NSAID prescribing as well as shifting prescribing from nonselective NSAIDs to celecoxib specifically.

Although patient activation can empower patients for greater participation in health care decision making with their physicians, our findings suggest some potential adverse effects of patient activation. The medications requested in the clinical scenarios were carefully chosen to be plausible but potentially undesirable choices. Although narcotic pain medications can be helpful for short-term pain management, they are generally not recommended for the management of sciatica. Similarly, although NSAIDs have a role in the management of knee pain, celecoxib would be a much more costly therapeutic option than a nonselective cox-2 inhibitor, without additional therapeutic benefit.

The filmed vignettes were carefully produced so that the scenarios were identical other than the presence or absence of the specific medication request at the end. It is striking that in the absence of a specific request, only one physician responded to the sciatica vignette by recommending a prescription for oxycodone. Given the relative contraindication of the patient's occupation (driving included as job task) and the potential for misuse or diversion of oxycodone, the finding that 20% of physicians seeing an active request for oxycodone would prescribe the medication suggests that patient activation can lead to riskier prescribing. In parallel manner, the findings from the OA scenario suggest that most physicians would not routinely use the very expensive celecoxib but that an active request would trigger substantially greater use, with higher costs for patients and health insurers.

Granting a patient request was neither affected by patient or physician design effects, nor were there more significant effects of organizational or other physician characteristics than would be expected by chance alone. Despite suggestions that acceding to a medication request may vary both by a patient's SES and race/ethnicity,[19] we found that the success of a request was not influenced by these attributes. The difference in the percentage of physicians who reported prescribing the medication requested was similar across the 2 scenarios.

There are several potential limitations to this research. The presentation of symptoms and clinical decision making occurred in an artificial environment, which may threaten external validity. Three precautionary steps were taken to enhance external validity. First, painstaking efforts were made to ensure clinical authenticity: practicing physicians participated closely in script development and were present during filming. Second, physicians viewed the scenarios in their offices and in the context of a typical practice day. Third, they were instructed to view the "patient" as one of

their own patients and respond as they normally would in everyday clinical practice. Physicians were specifically asked how typical the "patient" viewed in the video was compared with patients in their everyday practice—96% considered them very or reasonably typical. Attempting to avoid potential bias due to priming, we always presented the passive request first. However, ideally, the order of vignette presentation should have been randomized. Fifth, our results may have limited generalizability because of purposive recruitment rather than random sampling of physicians. However, we recruited physician subjects from 6 states. The consistency of the results across the 2 separate experiments is noteworthy. In addition, the use of a balanced randomized design (rather than an observational approach) provides unconfounded estimates of the effects of design variables. We included physicians by race/ethnicity according to their prevalence in the states studied, thus making it difficult to have sufficient power to address differences by this factor.

These findings have important implications for both clinical practice and for policy. The results highlight the ongoing need for improving strategies for patient-physician communication. Clinicians need to develop approaches to deal with requests for specific narcotic pain medications in a manner that respects patient autonomy and takes patient concerns seriously, without necessarily agreeing to request for medications that may not be indicated, or for which safer and more affordable options are readily available. Educational interventions that can help physicians to inform patients about better and safer medication choices may support physicians in this effort.

Our findings have important implications with respect to DTCA, which has rapidly increased since 1997 and is an effective marketing strategy. It uses all modes of communication (radio, television, and the internet) to activate patients to "ask your doctor." DTCA is increasing the total number of patients who become activated and make specific requests of their physicians. As DTCA is used exclusively for expensive medications, generally those like celecoxib that are still available only in branded forms, this effect is likely to increase medication costs for patients and for the health care system overall. In addition, our findings suggest that some requests from activated patients—whether prompted by DTCA or by the advice of a friend or relative—may result in suboptimal care. For example, increased use of celecoxib for osteoarthritis and oxycodone for sciatica could result in avoidable complications because of the toxicities of these drugs as compared with alternative medications. In addition, successful requests for narcotics will place more of these drugs into community circulation, potentially fueling the current explosion in illicit use of prescription narcotics. These results highlight potential negative impacts of DTCA and other forms of patient activation in medication requests. These are important and timely considerations, given the United States' distinctive position as one of only 2 countries where DTCA is legal.

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