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EFFECTS OF PATIENT MEDICATION REQUESTS ON PHYSICIAN PRESCRIBING BEHAVIOR: RESULTS OF A FACTORIAL EXPERIMENT

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Abstract

Background—Due to 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, while the other half requested something to

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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 recuited 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). 53% 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 non-selective NSAID (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.

Keywords

Direct to consumer; patient activation; disparities

Introduction

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 (FDA) 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]

Despite misgivings, many physicians accede to a patient's medication request.[7–9] Whether this varies by patient attributes (such as gender, race/ethnicity and socioeconomic status), physician characteristics (such as gender 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 three 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 two balanced experiments using two 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, while 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…"*

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 gender 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 six main effects: two physician factors (gender, years in practice), and four patient factors (race/ethnicity, gender, 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. In order to minimize the influence of prior exposure, the respective "patients" within each pair represented different combinations of gender, race/ethnicity, SES and presentation style. Mindful of the potential for biased responses due to 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 the recommendation of these colleagues, several minor distractions were embedded in the presentation to increase the clinical authenticity of the scenario (See Table 1). Scripts for the scenarios of interest were developed from tape-recorded role-playing sessions with experienced, clinically active physicians. Following their development two clinical coauthors (JK, MF) along with four 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 the symptoms of the two conditions. The same actor/actress portrayed four different patients: two presentation styles (active vs. passive medication request) and two 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 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 (e.g. 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 5–7 minutes in duration, reflecting the average length of a consultation.[12] Differences between "patients" (by gender, race/ethnicity, and socioeconomic status) are illustrated in the supplementary digital content (see Figure, Supplementary Digital Content 1, which shows the same actor presenting as either a low or high SES "patient").

Sciatica and chronic knee osteoarthritis were selected for study because: (a) they are common problems presented by patients of both genders 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 life style actions; (d) there is a recent increase in requests for analgesic medications for musculoskeletal conditions in the US; (e) a recent analysis of data from the Drug Enforcement Administration reveals that the use of pain medicine in the US 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 1992–2002) or >20 years experience (graduated between 1970–1991) in order 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 four design cells (2 levels of gender 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 semi-structured 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, $3*2^2=12$ 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 two physician factors (gender, physician experience) define four strata. Within each stratum, 48 participants (physicians) were purposively sampled and randomly assigned to view one of the 24 pairs of vignettes. This constituted two 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 standard deviations. 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 two-way interactions the sample also provided 80% power to detect a difference of 0.2 standard deviations.

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 four patient and two 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, while 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).

While logistic regression may be more technically appropriate for dichotomous variables, we choose to use ANOVA for several reasons: (1) due to data sparseness (2 replications of the 96 combinations of predictive factors), we cannot estimate the full model with logistic regression while we can with ANOVA; (2) the two models are equivalent due to the Central Limit Theorem and empirical experience; (3) this Fisherian regression is equivalent to linear discriminant analysis;[17] and (4) ANOVA allows for more straightforward interpretation of the estimation results when many interactions are included in the model. As we have two 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] Also, 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 vs 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 pre-paid basis, use of electronic medical records and practice culture. We also considered physician perceptions and opinions regarding 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. Due to 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 due to chance alone. We analyzed 44 covariates for two 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 (IMGs).

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, while 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 ($p<0.001$) (see Figure, Supplementary Digital Content 2, 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 NSAID ($p=0.008$) or not prescribe an NSAID ($p=0.004$), and were non-significantly less likely to choose a narcotic ($p=0.11$).

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. Even though physician subjects encountered one active request and one passive presentation (no request), there is consistency across the two conditions.

The effect of physicians' workplace, perceptions and opinions are presented in the supplementary digital content (see Table, Supplementary Digital Content 3, which shows prescription of oxycodone for sciatica and Celebrex for osteoarthritis by features of the workplace; and see Table, Supplementary Digital Content 4, which shows prescription of oxycodone for sciatica and Celebrex for osteoarthritis by physician perceptions and opinions). Of the 44 features considered as covariates, only five appeared significantly related to a physician's willingness to accede to patient medication requests, none of which were consistent across the two 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 ($p=0.01$). While 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 less than 0.05.

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 non-selective NSAIDs to celecoxib specifically.

Although patient activation can empower patients for greater participation in healthcare 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, while NSAIDs have a role in the management of knee pain, celecoxib would be a much more costly therapeutic option than a non-selective 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 fashion, 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 not 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 two 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 two 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 requests 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. Since 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 healthcare 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 due to 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 two countries where DTCA is legal.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. Fox, S. [Accessed December 6, 2013] Pew Internet: Health, Pew Internet & American Life Project. Jul 1. 2013 Available at: http://www.pewinternet.org/Commentary/2011/November/Pew-Internet-Health.aspx

2. Hibbard, JH.; Cunningham, PJ. [Accessed December 6, 2013] How engaged are consumers in their health and health care, and why does it matter. Oct. 2008 Available at: http://www.hschange.com/CONTENT/1019/?topic=topic03
3. Riggs DL, Holdsworth SM, McAvoy DR. Direct-to-consumer advertising: developing evidence-based policy to improve retention and comprehension. Health Aff (Millwood). 2004; (Suppl) Web Exclusives:W4-249-252.
4. Huh J, DeLorme DE, Reid LN, et al. Direct-to-consumer prescription drug advertising: history, regulation, and issues. Minn Med. 2010; 93(3):50–52. [PubMed: 20429178]
5. Rosenthal MB, Berndt ER, Donohue JM, et al. Promotion of prescription drugs to consumers. N Engl J Med. 2002; 346(7):498–505. [PubMed: 11844852]
6. Berger JT, Kark P, Rosner F, et al. Direct-to-consumer drug marketing: public service or disservice? Mt Sinai J Med. 2001; 68(3):197–202. [PubMed: 11373692]
7. Khanfar NM, Polen HH, Clauson KA. Influence on consumer behavior: the impact of direct-to-consumer advertising on medication requests for gastroesophageal reflux disease and social anxiety disorder. J Health Commun. 2009; 14(5):451–460. [PubMed: 19657925]
8. Mintzes B, Barer ML, Kravitz RL, et al. How does direct-to-consumer advertising (DTCA) affect prescribing? A survey in primary care environments with and without legal DTCA. Cmaj. 2003; 169(5):405–412. [PubMed: 12952801]
9. Parnes B, Smith PC, Gilroy C, et al. Lack of impact of direct-to-consumer advertising on the physician-patient encounter in primary care: a SNOCAP report. Ann Fam Med. 2009; 7(1):41–46. [PubMed: 19139448]
10. Campbell EG, Pham-Kanter G, Vogeli C, et al. Physician acquiescence to patient demands for brand-name drugs: Results of a national survey of physicians. JAMA. 2013; 173(3):1–3.
11. Marceau, L.; McKinlay, J.; Piccolo, R. Academy Health June. Vol. 24. Orlando, FL: 2012. Clinical vignettes in health services research: advantages and limitations of different formats.
12. Konrad TR, Link CL, Shackelton RJ, et al. It's about time: physicians' perceptions of time constraints in primary care medical practice in three national healthcare systems. Med Care. 2010; 48(2):95–100. [PubMed: 20057331]
13. Associated Press. AP analysis finds U.S pain medicine use has skyrocketed 88 percent. International Herald Tribune. Aug 20.2007
14. Eisenberg JM. Physician utilization: the state of research about physicians' practice patterns. Med Care. 2002; 40(11):1016–1035. [PubMed: 12409848]
15. Sager A, Socolar D. Health Costs Absorb One-Quarter of Economic Growth, 2000–2005. BU School of Public Health. 2005 Data Brief No. 5.
16. Cochran, WG.; Cox, GM. Experimental Designs. New York: John Wiley and Sons; 1957.
17. Kendall, M.; Stuart, A.; Ord, JK. Design and Analysis, and Time Series. 4th ed.. Vol. 3. New York: Macmillan; 1983. The Advanced Theory of Statistics.
18. Miller, RG. New York: John Wiley and Sons; 1986. Beyond ANOVA: Basics of Applied Statistics.
19. Lee D, Begley CE. Racial and ethnic disparities in response to direct-to-consumer advertising. Am J Health Syst Pharm. 2010; 67(14):1185–1190. [PubMed: 20592325]

Table 1

The content of clinical vignettes for OA and Sciatica

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

Table 2

Patient and physician characteristics, N=192

	N (%) or Mean (SD)
Patient	
Age[a]	~45 or 68[b]
Sex[a]	
Male	96 (50%)
Female	96 (50%)
Race[a]	
White	64 (33%)
Black	64 (33%)
Hispanic	64 (33%)
SES[a]	
Lower	96 (50%)
Upper	96 (50%)
Medication Request[a]	
Active	96 (50%)
Passive	96 (50%)
Physician Subjects	
Age	49.4 (9.6)
Sex[a]	
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[a]	
<20 years	96 (50%)
>20 years	96 (50%)
Practice Type	
Family Practitioner	95 (49%)
Internist	86 (45%)
General Practitioner	11 (6%)
International Medical Graduate	
Yes	63 (34%)

	N (%) or Mean (SD)
No	123 (66%)

[a] by balanced factorial study design

[b] mid-40's for sciatica; late-60's for osteoarthritis

Table 3

Prescription received by patient request

	Active	Passive	p-value[c]
Sciatica			
Oxycodone	19 (19.8%)	1 (1.0%)	**<0.001**
Strong narcotic[a]	54 (56.2%)	29 (30.2%)	**<0.001**
Weak narcotic[b]	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
Non-selective NSAID	32 (33.3%)	49 (51.0%)	**0.008**
No NSAID	17 (17.7%)	33 (34.4%)	**0.004**

[a] hydrocodone, oxycodone, vicoprofen, roxicet, percocet

[b] codeine, tramadol, ultracet, propoxyphene napsylate

[c] N (%) are from raw data; p-value from ANOVA for a balanced factorial experiment, including all two-way and higher-order interactions; physicians could prescribe more than one drug

Table 4

Prescription of oxycodone for sciatica and Celebrex for osteoarthritis by patient and provider characteristics

	Oxycodone		Celebrex	
	N (%)	p-value[a]	N (%)	p-value[a]
Patient gender		**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 gender		**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 years	9 (9.4%)		41 (42.7%)	
≥20 years	11 (11.5%)		33 (34.4%)	

[a] N (%) are from raw data; p-value from ANOVA for a balanced factorial experiment, including all two-way and higher-order interactions