

Pharmaceutical Company Influence on Nonsteroidal Anti-Inflammatory Drug Prescribing Behaviors

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Nonsteroidal anti-inflammatory drugs (NSAIDs) are among the most commonly prescribed medications,¹ despite their well-documented adverse effects, including gastrointestinal bleed and renal dysfunction.²⁻⁴ Recommendations for improving benefits while reducing adverse events have focused on strategies to improve physicians' NSAID prescribing behaviors.⁵⁻⁷ Safer prescribing strategies include modifications of type and dosing of NSAIDs and concomitant use of protective agents such as misoprostol and proton pump inhibitors in high-risk patients.^{6,7} Despite their acceptance as markers of high-quality care,⁸⁻¹⁰ adherence to safer NSAID prescribing strategies remains between 27% and 42%.¹¹⁻¹³ Publication of guidelines in high-impact journals and endorsement by medical societies have not translated into higher rates of safer NSAID prescribing behaviors. Ineffective dissemination and implementation strategies at the individual physician level may explain the poor adoption of guidelines for safer NSAID prescribing given the contrasting success of pharmaceutical marketing.

NSAID prescribing behaviors changed dramatically from 1999 to 2004, with a significant rise in total prescriptions and a proportionate increase in cyclooxygenase-2 (COX-2)-selective NSAIDs compared with nonselective types.^{14,15} The significant change has been attributed to pharmaceutical companies' marketing efforts after approval of novel COX-2-selective NSAIDs in 1999.¹⁵⁻¹⁷ Healthcare organizations and investigators might benefit from a greater understanding of how pharmaceutical companies influence physicians' prescribing behaviors to harness these strategies in interventions designed to improve the quality and safety of NSAID prescribing behaviors. Using in-depth qualitative interviews of physicians who routinely prescribe NSAIDs, this study explores the methods that pharmaceutical companies use to influence physicians' NSAID prescribing behaviors and physicians' perceptions of and counterweights to these influences.

METHODS

Study Design and Participants

The Institutional Review Board at Baylor College of Medicine approved this study. Qualitative methods^{18,19} were used to explore physicians' perceptions of the ways pharmaceutical companies influence their NSAID prescribing

Objectives: To describe the taxonomy of methods used by pharmaceutical companies to influence physicians' nonsteroidal anti-inflammatory drug (NSAID) prescribing behaviors and to elicit physicians' perceptions of and counterbalances to these influences.

Study Design: In-depth interviews analyzed using the constant comparative method of qualitative data analysis.

Methods: Qualitative interviews were conducted with physicians representing various clinical specialties. Interviews were transcribed and coded inductively using grounded theory. Recruitment was stopped at 25 participants after the attainment of thematic saturation, when no new concepts emerged from ongoing analysis of consecutive interviews.

Results: Physicians described a variety of influences that shaped their NSAID prescribing behaviors, including detailing and direct contact with pharmaceutical representatives, requests from patients inspired by direct-to-consumer advertisements, and marketing during medical school and residency training. Physicians described practice guidelines, peer-reviewed evidence, and opinions of local physician experts as important counterweights to pharmaceutical company influence. Local physician experts interpreted and provided context for new clinical evidence, practice guidelines, and NSAID-related marketing.

Conclusions: The social and communicative strategies used by pharmaceutical companies can be adapted to improve physicians' adoption of guidelines for safer NSAID prescribing. Communicative interactions between local experts and other physicians who prescribe NSAIDs may be the critical target for future interventions to promote safer NSAID prescribing.

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behavior. Study subjects participated in semistructured in-depth interviews from February to April 2006 to allow us to describe the methods of pharmaceutical company influence on NSAID prescribing behaviors.

Data Collection and Procedures

Study personnel identified individuals who met the eligibility criteria of being a licensed (nontrainee) physician who routinely prescribed NSAID therapy. Participants were purposefully recruited from a variety of practice settings, including a veterans hospital, publicly funded health system, private hospital and academic ambulatory clinic, and a diversity of medical and surgical specialties. Purposive sampling identifies cases that will generate new hypotheses, reveal novel modifying or moderating variables, or describe the complexity of multiple interrelations simultaneously among variables.¹⁹ Participant recruitment was stopped at the point of thematic saturation,^{19,20} when no new concepts emerged from ongoing analysis of at least 5 interviews from participants of different specialties.

Interviews were conducted by one of us (ALW) and consisted of open-ended questions to elicit perceptions about the role of pharmaceutical representatives and marketing on NSAID prescribing practices. Interviews began with the following statement and question: "We know that NSAIDs are used very commonly for pain relief and for control of acute and chronic inflammation. When prescribing NSAIDs to your patients, how do you decide which NSAID to prescribe?" Responses to this question were explored using probes focused on the influence of pharmaceutical companies, representatives, drug samples, and marketing, including the variety of marketing techniques and participants' perceptions of those techniques.

Data Analysis

Interviews lasted approximately 1 hour and were audio-taped and transcribed for analysis. Data were analyzed using the constant comparative method.^{18,19} Three of us (ADN, ALW, NSA) independently reviewed each transcript line by line to identify and sort segments of data with similar concepts into distinct categories. Sorted categories evolved inductively into a coding system based on the grounded theory of qualitative analysis.¹⁹ Investigators applied the coding system to each transcript independently. After additional rounds of independent coding, investigators convened as a group for careful review, negotiation, and consensus building to resolve discrepancies in coding. With coding of successive transcripts, the coding system was expanded, refined, and applied to previously coded data.²⁰ Resulting categories comprise the final coding scheme for elaborating study findings and themes.^{18,19}

RESULTS

Participant Characteristics

Twenty-five participants were recruited. All were affiliated with an academic medical center, and they spent most of their time in direct clinical care. Characteristics of participants are given in the **Table**. One-half were women, and one-third were of nonwhite race/ethnicity. Specialties commonly associated with a high volume of NSAID prescriptions were well represented, including internal medicine, rheumatology, general surgery, physical medicine and rehabilitation, and geriatrics. On average, participants reported 16 years of postresidency clinical experience. Encounters with pharmaceutical company representatives varied from daily (12%) to no reported interactions (12%).

Influence of Pharmaceutical Company Practices on NSAID Prescribing Behaviors

Participants described several themes regarding methods used by pharmaceutical companies to influence their NSAID prescribing behaviors. These can be categorized into the following 3 broad themes: detailing and direct marketing, patients' requests for medications, and shaping prescribing habits during formative training. Participants related that these influences have been present over most of their careers but were heightened during the period when COX-2-selective NSAIDs were introduced and marketed.

Theme 1: Detailing and Direct Marketing. Participants described a variety of methods used by pharmaceutical companies to directly influence their NSAID prescribing behaviors. Visits to physicians' offices by pharmaceutical representatives to provide details of their products (ie, detailing) were frequently described:

...[I]f you can get the drug reps, of course, to promote it if it's their drug, because those people are actually out in the physicians' offices and they quite often can have 5, 10, 15 minutes of, you know, one-on-one time to actually show [the drug] to them.

Another participant put it more bluntly:

...[T]he drug reps for the COX-2s...They hammered us with all the statistics....

Participants were savvy about the influence of detailing visits. One described the approaches thusly:

I guess we all get somewhat influenced by the drug representatives. You know...I appreciate the ones that bring me in some literature. I don't like the ones that come in and just say,

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well, you know, use my drug, it's better, but they have nothing to back it up, but if I have some literature that backs up the efficacy or safety or some overall benefit of the drug, then I think I'm more likely to believe that.

Participants also described how provision of medication samples by pharmaceutical representatives was frequently associated with direct marketing efforts. They had mixed feelings about the availability of medication samples, stating that samples assist patients who have difficulty paying for medications:

I do reserve my drug samples for people that I believe cannot afford the more expensive medicines, and so I do give out, sometimes I give a patient a full course of medications from my sample cabinet. The patient may try to fill the prescription and then find out the cost and then will call me back and say, well, I'm just going to take Advil...it opens a bunch of risk factors.

Participants also suggested that providing samples could influence their NSAID prescribing behaviors:

...[W]hen [pharmaceutical companies] provide samples, [physicians] usually, instead of following guidelines, they usually end up writing a prescription they were provided a sample [for], and once they give the patient a sample and the medication works, then they tend to continue prescribing the same medication. So whatever is available from some pharmaceutical company with free drugs, that's what they would use.

Theme 2: Patients' Requests for Medications. Participants frequently cited the effect of patients' requests for specific brands of NSAIDs. Invariably, these were the products of direct-to-consumer advertising that influenced the patient or a close friend or relative:

I've had in the past people bring it up, because it was so heavily advertised.

Oh, absolutely. Oh, yeah, yeah. I think that direct consumer marketing is huge with patients.

Several described how patient requests influenced their NSAID prescribing behaviors:

...[T]he direct consumer advertising is the bane of every working physician in this country...Ask your doctor if you need...Of course...Absolutely. If you're asking, you bet you do. Right. And, you know, it's how much resistance can I put up?

Theme 3: Shaping Prescribing Habits During Formative Training. Participants described how NSAID prescribing

■ **Table.** Characteristics of 25 Study Participants^a

| Characteristic | No. (%) |
|--|---------|
| Age, y | |
| ≤35 | 6 (24) |
| 36-44 | 11 (44) |
| 45-55 | 4 (16) |
| 56-64 | 2 (8) |
| Female sex | |
| 13 (52) | |
| Nonwhite race/ethnicity | |
| 8 (32) | |
| Specialty | |
| Internal medicine | 16 (64) |
| Cardiology | 1 (4) |
| Rheumatology | 1 (4) |
| Geriatrics | 1 (4) |
| General surgery | 1 (4) |
| Physical medicine and rehabilitation | 2 (8) |
| Infectious disease | 2 (8) |
| Nephrology | 1 (4) |
| Practice duration, y | |
| 1-5 | 3 (12) |
| 6-15 | 13 (52) |
| 16-25 | 3 (12) |
| >25 | 6 (24) |
| Institutional setting | |
| Veterans Affairs medical center | 10 (40) |
| Public hospital | 8 (32) |
| Private academic hospital | 7 (28) |
| Interaction with pharmaceutical representatives | |
| Daily | 3 (12) |
| ≥3/wk | 1 (4) |
| 1-2/wk | 6 (24) |
| 1-2/mo | 12 (48) |
| No interaction | 3 (12) |
| Scope of practice | |
| Outpatient only | 6 (24) |
| Inpatient only | 3 (12) |
| Both | 16 (64) |
| ^a Two participants did not respond. | |

behaviors were established during their formative training as physicians, especially in residency:

I think people's patterns in prescribing get set pretty early when they're in residency, and they tend to fall back on those patterns quite a bit....

Sure. When you do it as a resident, you're inclined to keep doing it...

Many described that pharmaceutical companies influenced how their medications were used during formative training and how this shaped inchoate prescribing behaviors:

Pfizer pretty much ruled the formulary. So I think they did a very good job of getting their point across and educating on their medications, and I can say easily in my first several years out in practice, those medicines that I knew very well from residency, and really understood their side-effect profile and everything, that I continued to use for several years after that...

Participants, from various specialties and years in practice, described the influence of pharmaceutical companies during formative training. Participants related how their residency programs established policies barring such contacts with residents during work hours.

...[T]hat hospital had a total anti-drug rep mindset. I remember one time I was precepting residents in the clinic, and I said, "Hey, where's the drug reps?" And a resident looked at me like I had 3 heads and said, "Why would we want them around here? They just influence our practice the wrong way."

Counterbalances to Pharmaceutical Company Influence on NSAID Prescribing Behaviors

Participants were well aware of the role of pharmaceutical marketing, direct advertising, and representatives in shaping NSAID prescribing behaviors. Most participants described how they attenuated this influence using alternative sources of information, including practice guidelines or peer-reviewed evidence and opinions of trusted local experts.

Theme 4: Alternative Information Sources for Shaping NSAID Prescribing Behaviors. Most participants described routine use of journals, electronic peer-reviewed literature, and professional meetings as their primary sources of new evidence and practice guidelines. One physician summarized these sources:

I try to keep up with reading in the journals, like the New England Journal [of Medicine], and one of these like the Internal Medicine News...New things that come out, I read up on...And is probably my other primary source for finding quick facts. And then I'll go into PubMed and do searches if I need to know a little more detail.

Participants also described guidelines as sources of unbiased information:

It's better to have a big conglomerate of doctors form some sort of committee without any outside bias or interests...to come up with what they feel is the most appropriate way to treat patients...it bears more weight than just one person who did one study or was funded by one company to do one study, to publish a set of guidelines.

Another participant described the role of local physician experts as counterbalances to pharmaceutical company influence:

Well, thinking about myself, the biggest disseminator of information around here is really word of mouth from other physicians. You know, we don't have drug reps coming in to tell us things, and certainly I don't want to listen to what the drug rep has to say. I don't want that to be my source of information...

Theme 5: Local Physician Experts Interpret and Provide Context for New Clinical Evidence, Practice Guidelines, and Pharmaceutical Marketing. Despite their affirmation of evidence-based literature and familiarity with practice guidelines, participants reported having trouble integrating practice guidelines into their NSAID prescribing behaviors. One physician described his difficulty with guidelines as follows:

The guidelines that you commonly use, I think you continue to practice by, but other than that, I mean they all tend to blend together for me, because they tend to all be so similar.

Another physician described her apprehension regarding a practice guideline after she had a previous adverse experience:

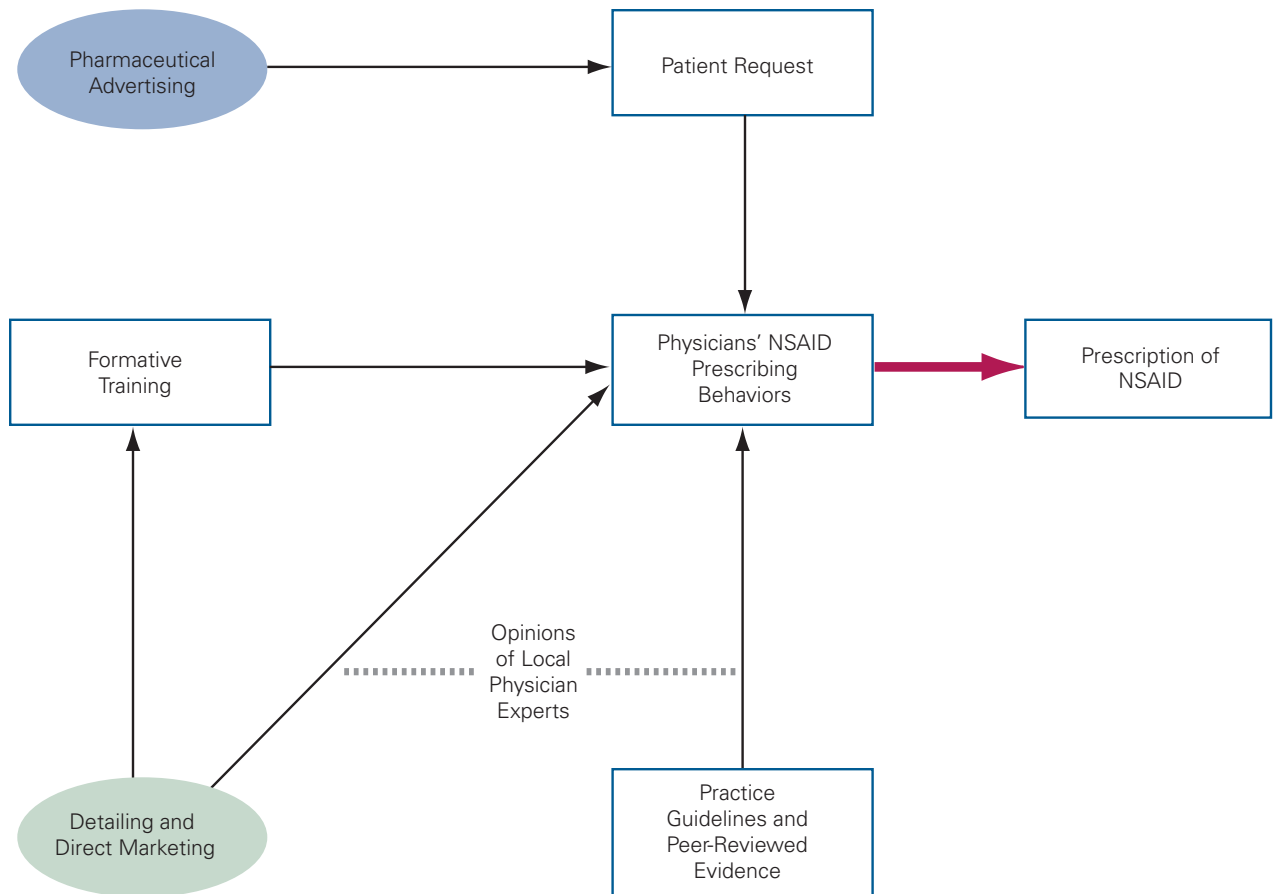
We've all had circumstances where we give a patient a particular drug and they have such a serious adverse effect...we become skittish about ever giving another patient that [drug], even though you know intellectually that maybe 0.1% of all the people who ever took this drug...I think that had a large effect on our practice patterns and probably [is] one of the reasons why we don't follow guidelines.

Participants described how local experts and trusted physicians serve as interpreters of evidence and guidelines into a practice context that influenced their prescribing behaviors:

Do I use guidelines?...Really, really not. I would say the things that have most shaped my recent NSAID prescribing practices (knowing that I don't have contact with drug reps anymore)...is conversations with colleagues.

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■ **Figure.** The Influences of Pharmaceutical Company Marketing on Nonsteroidal Anti-Inflammatory Drug (NSAID) Prescribing Behaviors Reported by Physicians in Routine Clinical Practice



Prescribing behaviors reported by physicians are shown in separate panels. The ovals represent specific social and communicative influences arising from pharmaceutical company advertising, marketing, and detailing. Physicians reported that these had direct and indirect influences on their NSAID prescribing behaviors. Physicians also reported that practice guidelines and peer-reviewed evidence were important counterbalances to pharmaceutical marketing. Local physician experts interpret and provide context to pharmaceutical marketing, practice guidelines, and novel scientific data.

I think that my own impression is and I think it's based on our rheumatology database...the guy that runs it is a doctor whom I've heard speak before...he has a lot of data on the traditional NSAIDs, and I think that those pan out to be a little bit safer, so I try to use that if I can.

DISCUSSION

Physicians described several social and communicative strategies used by pharmaceutical companies to influence their NSAID prescribing behaviors, including detailing and direct contact with pharmaceutical representatives, requests from patients inspired by direct-to-consumer advertisements, and marketing during formative medical school and residency training. Practice guidelines and peer-reviewed evidence, as well as local physician experts, were viewed as important counterweights to the influence of pharmaceutical companies

on prescribing behaviors. All study participants described routine experiences with pharmaceutical marketing and their use of counterweights to this influence. These multifaceted influences that affect physicians' NSAID prescribing behaviors are shown in the **Figure** as separate boxes.

The marketing strategies of pharmaceutical companies are shown as ovals in the **Figure**. Detailing and direct promotion to physicians were frequently cited as direct influences on prescribing behaviors and as indirect influences mediated through the experiences of formative training, as well as by suspicion that guidelines were tainted by pharmaceutical promotion. Critics of industry influence often decry the more egregious use of free meals, honoraria, and medication samples, but the influence of direct communication with physicians using in-office presentations and other detailing of products may be the most effective.²¹ Pharmaceutical detailing is characterized by persuasive use of epidemiologic and

Take-Away Points

Adherence to practice guidelines for safer nonsteroidal anti-inflammatory drug (NSAID) prescribing remains low, despite their acceptance as markers of high-quality care.

- Physician participants described a variety of social and communicative strategies, including those used by pharmaceutical companies, that shaped their NSAID prescribing behaviors.

- Participants detailed how relationships with local physician experts provide interpretation and context to new clinical evidence, practice guidelines, and pharmaceutical marketing related to NSAID prescribing behaviors.

- An approach that models these social and communicative strategies and targets communication among physicians may significantly enhance adoption of practice guidelines for safer NSAID prescribing.

in parallel or interchangeably. Instead, they described a serial pattern in which the medical literature and guidelines were viewed as evidence based but as overly generic and, in some cases, as influenced by pharmaceutical companies. The role of local physician experts in providing validation of evidence and marketing has been previously described,²⁸ but their influence in interpreting guidelines to provide local context

statistical data that is often biased with only the presentation of favorable results.²² A study²³ reporting the characteristics and influence of detailing by the manufacturers of gabapentin found that most visits to physicians lasted 5 minutes or less and had high informational value. The most effective visits were accompanied by delivery or a promise of samples and occurred in small groups. Detailing visits were surprisingly effective at influencing prescribing behaviors, even for off-label use of medications,²³ as most participants reported some change in their prescribing behaviors after marketing.

Consumer advertising that instructs patients to “tell their physician” about particular symptoms and specific medications was described as having an indirect influence on physicians’ NSAID prescribing behaviors (Figure). Direct-to-consumer advertising has been strongly associated with changes in physician prescribing behavior when advertising is closely associated with requests by patients for specific drugs.²⁴ For example, advertising of rofecoxib and celecoxib to consumers increased the number of patients seen by physicians each month and the likelihood that patients received both NSAIDs,¹⁶ especially when patients specifically requested a COX-2–selective NSAID.²⁵ Participants also described how the influence of pharmaceutical companies on prescribing behavior begins early in a physician’s education and training (formative training box in the Figure). Influences during formative training are effective in anchoring subsequent behavior within a fixed set of prescribing patterns that can become resistant to change. This phenomenon, often described as clinical inertia,²⁶ is a significant barrier to aligning physicians’ prescribing behaviors with new and compelling scientific evidence.²⁷

Participants in this study described the role of practice guidelines, peer-reviewed evidence, and opinions of local physician experts as bulwarks against pharmaceutical marketing. In terms of their influences on NSAID prescribing behaviors, participants described the role of practice guidelines as strikingly different from that of local physician experts (Figure). Participants did not use these information sources

for new evidence is not well characterized. Trusted physician experts seem to be more effective at communicating new information within existing clinical heuristics (decisional rules of thumb) and at rationalizing physicians’ cognitive biases related to adoption of new evidence.²⁹ They may be important moderators of the influence of pharmaceutical company marketing and of practice guideline dissemination on other physicians’ NSAID prescribing behaviors (Figure).

Limitations

This study has limitations. The qualitative design cannot provide quantitative estimates of the associations and patterns observed. In contrast, in-depth interviews allow for more detailed exploration of physicians’ perceptions of influences on their NSAID prescribing behaviors and of the interrelationships of these influences. The validity of these assessments may be affected by limitations in physicians’ self-reports of their prescribing behaviors. Generalizability of our results beyond the study sample may be limited because participants were sampled from only one geographic area. However, our recruitment procedures enrolled a spectrum of medical specialties, institutional settings, and years of clinical experience.

Implications

Evidence-based guidelines for safer NSAID prescribing are known to physicians, but they are not often adopted.^{28,30} The key insights of this study are that social and communicative interactions between local experts and other physicians who commonly prescribe NSAIDs may be the critical target for future interventions and that these interventions should adapt the full spectrum of pharmaceutical marketing strategies. For example, novel interventions include the following: (1) targeting communicative interactions between trusted physician experts and other local physicians using context-appropriate detailing of practice guidelines; (2) advertising corresponding messages in public settings within the hospital or clinic that encourage patients to make evidence-informed

requests to their physicians; and (3) developing educational and training initiatives for newly hired physicians and clinical trainees. The ultimate success of any such intervention to improve practice guideline implementation will be based on the degree of "social innovation"²⁸ fostered by the intervention components among physicians and between physicians and their patients.

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