

Factors Associated With Physicians' Reliance on Pharmaceutical Sales Representatives

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Abstract

Purpose

To examine relationships between pharmaceutical representatives and obstetrician–gynecologists and identify factors associated with self-reported reliance on representatives when making prescribing decisions.

Method

In 2006–2007, questionnaires were mailed to 515 randomly selected physicians in the American College of Obstetricians and Gynecologists' Collaborative Ambulatory Research Network. Participants were asked about the information sources used when deciding to prescribe a new drug, interactions with sales representatives, views of representatives' value, and guidelines they had read on appropriate industry interactions.

Results

Two hundred fifty-one completed questionnaires (49%) were returned. Seventy-six percent of participants see sales representatives' information as at least somewhat valuable. Twenty-nine percent use representatives often or almost always when deciding whether to prescribe a new drug; 44% use them sometimes. Physicians in private practice are more likely than those in university hospitals to interact with, value, and rely on representatives; community hospital physicians tend to fall in the middle. Gender and age are not associated with industry interaction. Dispensing samples is associated with increased reliance on representatives when making prescribing decisions, beyond what is predicted by a physician's own beliefs about the value

of representatives' information. Reading guidelines on physician–industry interaction is not associated with less reliance on representatives after controlling for practice setting.

Conclusions

Physicians' interactions with industry and their familiarity with guidelines vary by practice setting, perhaps because of more restrictive policies in university settings, professional isolation of private practice, or differences in social norms. Prescribing samples may be associated with physicians' use of information from sales representatives more than is merited by the physicians' own beliefs about the value of pharmaceutical representatives.

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Although pharmaceutical sales representatives are a convenient source of information about certain drugs, they do not provide potential prescribers with a comprehensive overview of available evidence and treatment options. Rather, they naturally tend to present a biased

subset of carefully selected information to promote the use of their products.^{1–4} Using information provided by pharmaceutical representatives has been shown to result in increased prescribing costs,⁵ reduced prescribing of generics,⁶ and other suboptimal patterns of prescribing.⁷ Residents' prescribing decisions are also affected by their access to drug samples⁸; furthermore, increased restrictions on samples and sales representatives in training environments have been associated with fewer interactions, even after finishing residency.^{9–11}

Many health care societies have developed guidelines for interactions between physicians and the pharmaceutical industry, including, for example, the American College of Obstetricians and Gynecologists (ACOG), the American Medical Association, and the Association of American Medical Colleges.^{12–14} Guidelines about the pharmaceutical industry's interactions with medical students and residents have been developed in some university hospitals. Though few studies have assessed the effect of physician–industry interaction

guidelines on physicians' practice patterns, there are some data suggesting that guidelines in general can have an effect; for example, 61% of obstetricians and gynecologists (ob-gyns) report that reading ACOG clinical practice guidelines has resulted in a change in their practice.¹⁵

But is there an association between reading these guidelines and relying less on sales representatives when making prescribing decisions? More generally, what factors are associated with dependence on sales representatives for information? We attempt to answer those questions and to describe the nature and prevalence of industry interaction among a national sample of ob-gyns. While a previous study examined ob-gyns' attitudes about the appropriateness of various gifts from industry through a series of hypothetical vignettes,¹⁶ this is the first study to describe the nature and extent of relationships in this specialty and examine factors associated with reliance on pharmaceutical representatives.

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Method

Participants

Beginning in November 2006, we sent a 20-item questionnaire to 515 ob-gyns who were ACOG members. We sent two subsequent mailings to nonresponders in December and January 2007. We randomly selected the sample from ACOG's Collaborative Ambulatory Research Network (CARN), a group of practicing physicians who have agreed to complete five to six surveys throughout the year; the sample closely resembles the entire ACOG membership in distribution of gender, age, and geographic location. For example, the mean ages for ACOG and CARN members are 48.7 (SD = 10.9) and 48.5 (SD = 10.2) years, respectively. ACOG membership comprises over 90% of board-certified practicing ob-gyns in the United States.

We included a cover letter in the mailing to explain the purpose and importance of the survey and to give a date by which to reply. We also explained that informed consent was implied by returning a completed survey. Participation was voluntary and we offered no compensation. The survey was approved by the Carnegie Mellon University institutional review board.

Questionnaire

Physician characteristics. Participants were asked their gender, year of medical school graduation, primary practice location (urban, suburban, or rural), and primary practice setting (private practice, community hospital, university hospital, military or government hospital, or other).

Guidelines. Physicians were asked whether they had read any guidelines or other information on interacting with pharmaceutical industry representatives. If they had, they were asked to indicate the source: ACOG, American Medical Association, or other, checking all that apply.

Interaction with sales representatives. To assess tangible benefits received from sales representatives, respondents were asked how frequently they (1) gave drug samples to patients and (2) ate food provided by a pharmaceutical representative (every day, a few times per week, a few times per month, once per month or less, or never). Participants were also asked how many new drugs

they had begun prescribing in the last year, including drugs used for a new indication, and how many of those drugs they had first learned about through the pharmaceutical industry. For each respondent, we calculated the percentage of new drugs prescribed in the last year that the physician had first learned about through contact with a pharmaceutical company.

Attitudes. Participants were asked the extent to which they agreed or disagreed that “pharmaceutical representatives are a valuable resource in helping physicians learn about new drugs,” on a scale from –5 (strongly disagree) to 5 (strongly agree).

Drug information sources. Physicians were asked how often they relied on the following information sources when deciding whether to prescribe a new drug: pharmaceutical brochures, pharmaceutical representatives, journal articles, colleagues, Internet searches, advertisements, continuing medical education, and any other sources. Participants responded on a five-point scale (almost always, often, sometimes, rarely, or almost never).

The survey questions were developed for this study. We pilot tested them in a sample of physicians at a local university hospital and incorporated their comments and suggestions into the final version of the survey. Data for this study were gathered as part of a broader study that also asked about physicians' evaluations of a clinical trial abstract. Results of that study can be found in Silverman et al.¹⁷

Data analysis

We analyzed the data using SPSS 15.0 (SPSS, Inc., Chicago, Illinois). Descriptive statistics were computed for all study variables. For ease of comparison, bivariate associations were measured with correlation coefficients: Pearson for continuous variables, point biserial for continuous with dichotomous variables, phi for dichotomous with dichotomous variables, and *R* from linear regression for continuous or dichotomous with categorical variables. Associations between categorical variables were evaluated with the chi-square. To make pairwise comparisons of means across levels of categorical variables, univariate analysis of variance (ANOVA) was calculated using Bonferroni-adjusted *P* values to account

for multiple comparisons. Multivariate models were calculated using linear regression for continuous dependent variables and logistic regression for dichotomous dependent variables.

Results

Sample characteristics

Of the 515 mailed questionnaires, we received a total of 251 completed questionnaires (49%). On average, responders were 3.5 years older than nonresponders, $M = 49.3$ (SD = 10.3) versus 45.8 (SD = 9.4), $t(513) = 4.1$, $P < .001$. Correspondingly, responders were less likely to be female than nonresponders, 43% ($n = 108$) versus 53% ($n = 140$), $\chi^2 = 7.1$, $P < .05$. Because age and male gender are correlated among ob-gyns, we entered both variables simultaneously in a logistic regression of survey response. Older age, but not gender, independently predicts survey response. Responders did not differ significantly from nonresponders in geographical distribution.

Of the respondents, 43% ($n = 108$) were women. Most respondents were in private practice (72%, $n = 178$), with the remainder doing most of their clinical work in university hospitals (12%, $n = 30$), community hospitals (10%, $n = 25$), or other settings (6%, $n = 16$) such as HMOs, military, or government hospitals. The majority of participants practiced primarily in either an urban (41%, $n = 102$) or suburban (43%, $n = 106$) location, and 16% ($n = 41$) practiced primarily in a rural location. Participants had been graduated from medical school an average of 22 years (SD = 11) (See Table 1).

Physician–industry guidelines

The majority of participants (62%, $n = 154$) reported that they had read guidelines on interacting with the pharmaceutical industry. Of the full sample, 33% ($n = 81$) had read ACOG guidelines, 35% ($n = 86$) had read AMA guidelines, and 21% ($n = 49$) had read guidelines from another source, such as their own hospital, journal articles, and continuing medical education programs. These percentages add to more than 62% ($n = 154$) because 23% ($n = 58$) of the full sample had read guidelines from more than one source.

Table 1

Characteristics of a Sample of 251 Members of the American College of Obstetricians and Gynecologists' Collaborative Ambulatory Research Network Who Completed a Survey About Physician–Pharmaceutical Industry Interactions in 2006–2007

Questionnaire item	Mean (SD)	No. (%)
Demographics		
Years since medical school	22 (11)	
Female		108 (43)
Practice setting		
Private practice		178 (72)
Community hospital		25 (10)
University hospital		30 (12)
Other		16 (6)
Practice location		
Urban		102 (41)
Suburban		106 (43)
Rural		41 (16)
Physician–industry relations		
Have read guidelines on interacting with industry		
College of Obstetricians and Gynecologists guidelines*		81 (33)
American Medical Association guidelines*		86 (35)
Other guidelines*		49 (21)
Eat food provided by a sales representative		
Every day		2 (1)
A few times per week		19 (8)
A few times per month		90 (36)
Once per month or less		101 (41)
Never		36 (15)
Give drug samples to patients		
Every day		120 (48)
A few times per week		60 (24)
A few times per month		22 (9)
Once per month or less		13 (5)
Never		33 (13)
% of new drugs first learned about from drug companies	57 (41)	
Perceived value of sales representatives†	1.5 (2.3)	
Use sales reps for help with prescribing		
Almost always		24 (10)
Often		42 (17)
Sometimes		109 (44)
Rarely		65 (26)
Never		7 (3)

* Percentage of full sample, regardless of having read guidelines.

† Participants rated agreement with the statement that “pharmaceutical reps are a valuable resource in helping physicians to learn about new drugs” on a scale of strongly disagree (–5) to strongly agree (5).

Physician–industry interaction

Most physicians reported giving drug samples to patients daily (48%, $n = 120$) or a few times per week (24%, $n = 60$), while only 13.3% ($n = 30$) reported never giving out drug samples. Nearly half reported eating food provided by the

pharmaceutical industry at least a few times per month (45%, $n = 111$).

When asked whether pharmaceutical representatives were a valuable source in helping physicians learn about new drugs, the mean response, on a scale from

–5 (strongly disagree) to 5 (strongly agree), was 1.6 (SD = 2.3). Most respondents (76%, $n = 190$) agreed to some extent that pharmaceutical representatives are a valuable source, indicating a 1 or higher on this scale (Table 1).

Drug information sources

The most common sources of information that physicians reported turning to when deciding whether to prescribe a new drug were journal articles, continuing medical education, and colleagues (78%, $n = 196$; 74%, $n = 185$; 71%, $n = 178$, “often” or “almost always” use these sources, respectively). In addition, nearly a third of the sample (29%, $n = 73$) reported “often” or “almost always” using pharmaceutical sales representatives when deciding whether to prescribe a new drug, while another 44% ($n = 111$) reported “sometimes” using sales representatives (Figure 1).

Participants reported prescribing a median of 3 (Q1 = 2, Q3 = 4.5) drugs for the first time last year (including old drugs prescribed for a new indication). Of these newly prescribed drugs, physicians reported first learning about a mean of 57% (SD = 41) through contact with a pharmaceutical company (e.g., company mailings, sales representatives); 27% ($n = 68$) of respondents indicated that they did not first learn about any of their newly prescribed drugs through drug companies, and 38% ($n = 95$) reported first learning about all of their newly prescribed drugs through the companies.

Bivariate associations

Nearly all measures of industry interaction and attitudes are significantly associated with each other bivariately, as displayed in Table 2. The strongest correlation is between perceived value of pharmaceutical representatives and frequency of using representatives as an information source when deciding whether to prescribe a new drug ($r = 0.60$, $P < .001$). Physicians who have read guidelines on interacting with industry, relative to those who have not read guidelines, report eating food provided by pharmaceutical representatives less frequently ($r = -0.14$, $P < .05$) and giving samples to patients less frequently ($r = -0.20$, $P < .01$). Those who have read guidelines are also less likely to

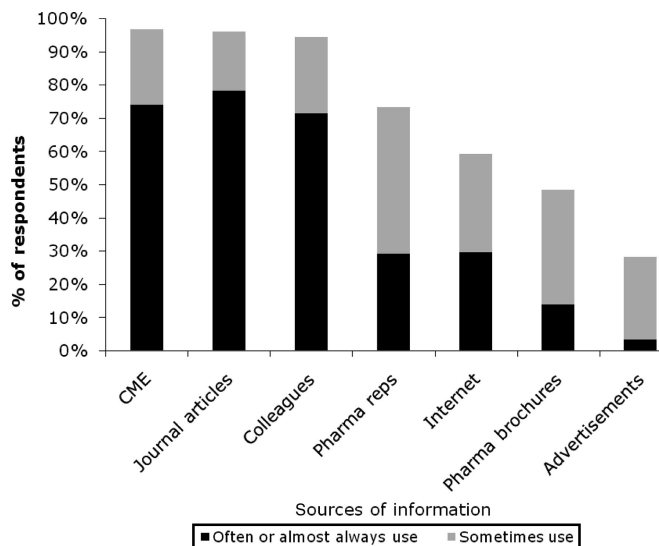


Figure 1 Sources that physicians reported using when deciding whether to prescribe a new drug in a 2006–2007 survey of 251 members of the American College of Obstetricians and Gynecologists' Collaborative Ambulatory Research Network. For each source, response options were "almost always," "often," "sometimes," "rarely," and "never." This figure shows what percentage of physicians answered "almost always" and "often" (combined) and "sometimes." Physicians use continuing medical education, journal articles, and colleagues the most when deciding whether to prescribe a new drug.

first hear about new drugs from pharmaceutical representatives ($r = -0.18, P < .01$) and less frequently use pharmaceutical representatives when deciding whether to prescribe a new drug ($r = 0.15, P < .05$). Notably, having read guidelines is not associated with perceived value of pharmaceutical representatives ($r = -0.05, n.s.$).

We examined whether the association between reading guidelines and less frequent use of pharmaceutical sales representatives for drug information was dependent on which guidelines were read. Participants who had read guidelines other than those of ACOG and AMA were asked to specify which they had read. Many ($n = 21$) of these were the guidelines or policies of participants' places of employment (e.g., hospital, HMO, military). Because these have the potential to be binding policies rather than optional guidelines, we coded them (post hoc) as a separate category. A univariate ANOVA indicated that type of guideline was significantly associated with frequency of using sales representatives when deciding whether to prescribe a new drug ($F(4,238) = 5.1, P < .01$). A post hoc, Bonferroni-adjusted analysis revealed that, as compared with those who had not read guidelines, those who reported reading ACOG, AMA, or multiple or other guidelines did not use sales

representatives significantly more or less often for drug information. However, those who reported reading guidelines from their place of work reported significantly less reliance on sales representatives for drug information ($P < .05$).

Among physician characteristics, only practice setting was associated with industry interaction and attitudes, as displayed in Table 2 and Figure 2. Physicians in private practice interact most heavily with industry, while those practicing in university hospitals tend to interact with industry at levels equal to or lower than those in community hospitals. The most dramatic difference between settings is in the proportion of physicians giving samples to patients at least a few times a week: 89% ($n = 158$) of those in private practice, 63% ($n = 16$) of those in community hospitals, 20% ($n = 6$) of those in university hospitals, and 6% ($n = 1$) of those in other settings (military or government hospitals, HMOs, and nonprofit clinics) ($F(3,242) = 55.8, P < .001$). The corresponding, opposite pattern is seen in the proportion of physicians that have read guidelines on industry interaction: 54% ($n = 96$) of those in private practice, 67% ($n = 17$) of those in community hospitals, 77% ($n = 23$) of those in university hospitals, and 94% ($n = 15$) of those in other settings ($F(3,241) = 4.1,$

$P < .01$). However, note that while the overall pattern is reversed for those who have read guidelines, the pairwise comparisons of practice types were not all significant.

Practice location was associated only with receiving tangible benefits. Post hoc, Bonferroni-adjusted analyses of a univariate ANOVA revealed that urban physicians give samples less frequently than suburban and rural physicians ($P < .01$) and that urban participants eat food provided by pharmaceutical companies less frequently than those practicing in suburban areas ($P < .01$). Gender and number of years since medical school were not associated with industry interaction or attitudes.

We examined the possibility that physicians who more frequently use pharmaceutical sales representatives for information seek to acquire a greater variety of information when deciding whether to prescribe a new drug. We found that, in making these prescribing decisions, physicians who more frequently rely on pharmaceutical sales representatives for information also more frequently use pharmaceutical company brochures ($r = 0.46, P < .001$) and other advertisements ($r = 0.28, P < .001$) while using sources such as journal articles ($r = -0.17, P < .01$) and searching on the Internet ($r = -0.19, P < .01$) less often than other physicians. Using sales representatives for information when making prescribing decisions is not associated with using continuing medical education or consulting with colleagues when making these decisions.

Multivariate models

Next, we constructed three linear regression models to determine which factors are associated with using pharmaceutical sales representatives for information when deciding whether to prescribe a new drug, controlling for intercorrelations between variables. These models are presented in Table 3.

Model 1. First, we tested whether reading guidelines is independently associated with relying less on pharmaceutical representatives for drug information, controlling for physician characteristics. In addition to whether physicians read guidelines, the model included only practice setting because this is the only physician characteristic that is associated

Table 2

Bivariate Associations Among Physician Characteristics and Physician–Industry Interactions for Responses From a Sample of 251 Members of the American College of Obstetricians and Gynecologists’ Collaborative Ambulatory Research Network Who Completed a Survey About Physician–Pharmaceutical Industry Interactions in 2006–2007*

Questionnaire item	Physician–industry interaction					
	Read guidelines	Eat food	Give samples	First learn of drugs from companies	Perceived value of reps	Use reps for prescribing [†]
Physician characteristics						
Female	−0.11	0.05	0.03	0.09	−0.09	−0.05
Years since medical school	0.11	−0.04	0.07	−0.05	0.09	0.12
Practice setting [‡]	0.24 [§]	0.43 [§]	0.71 [§]	0.35 [§]	0.28 [§]	0.35 [§]
Practice location [‡]	0.07	0.22 ^{§¶}	0.27 ^{§¶}	0.11	0.15	0.15
Physician–industry interaction						
Read guidelines on interacting with industry	1					
Frequency eating food provided by sales rep	−0.14 [§]	1				
Frequency giving drug samples to patients	−0.2 [§]	0.47 [§]	1			
% of new drugs first learned about from drug companies	−0.18 [§]	0.36 [§]	0.48 [§]	1		
Perceived value of sales reps	−0.05	0.25 [§]	0.29 [§]	0.32 [§]	1	
Use sales reps for help with prescribing [†]	−0.15 [§]	0.32 [§]	0.44 [§]	0.54 [§]	0.6 [§]	1

* Pearson coefficients are shown. This equals the point-biserial coefficient when a dichotomous variable is correlated with a continuous variable and equals phi when both variables are dichotomous.

[†] Frequency using pharmaceutical sales reps when deciding whether to prescribe a new drug.

[‡] For the categorical variables, practice setting and practice location, each coefficient represents the *R* from a simple linear regression on dummies of the categorical variable. Statistical significance was judged as $P < .05$ from the *F* test of the regression ANOVA.

[§] $P < .05$.

[¶] Post hoc, Bonferroni-adjusted analyses showed that urban participants gave samples less frequently than both suburban and rural participants, and that urban participants ate food provided by pharmaceutical companies less frequently than those practicing in suburban areas.

with the dependent variable bivariately. The association between reading guidelines and relying less on pharmaceutical representatives for drug information is completely accounted for by practice setting. Practicing privately ($\beta = .20$, 95% CI: .11, .29) and in a community hospital ($\beta = .19$, 95% CI: .07, .31) were associated with significantly more reliance on pharmaceutical representatives for information when prescribing new drugs as compared with those practicing in university hospitals, controlling for whether guidelines were read.

We reran this model with a variable that codes whether the guideline read is associated with the person’s place of employment. Employment-based guidelines were not significantly associated with reliance on sales representatives when controlling for practice setting.

Model 2. Second, we added the two measures of tangible benefits received from pharmaceutical sales representatives to Model 1: frequency of eating food

provided by pharmaceutical companies and giving drug samples to patients. In this model, practice setting is no longer significantly associated with reliance on sales representatives when prescribing, indicating that, when levels of eating pharma-provided food and giving drug samples are held constant, those in private practice and community hospitals are no more likely than those practicing at university hospitals to use pharmaceutical sales representatives when making the decision to prescribe a new drug. Frequency of eating industry-funded food ($\beta = .16$, 95% CI: .02, .31) and giving drug samples to patients ($\beta = .24$, 95% CI: .13, .36) are independently associated with greater reliance on pharmaceutical representatives for drug information when prescribing new medications.

Model 3. Finally, to Model 2 we added the perceived value of pharmaceutical representatives in helping physicians to learn about new drugs. In this model, the perceived value of pharmaceutical representatives ($\beta = .55$, 95% CI: .44,

.66) is independently associated with greater reliance on pharmaceutical representatives for drug information. Eating industry-provided food is no longer significantly associated with the dependent variable ($\beta = .07$, 95% CI: −.06, .19), while the magnitude of the association between the dependent variable and giving drug samples is reduced ($\beta = .16$, 95% CI: .06, .26). Physicians who eat more industry-funded food or give more drug samples to patients tend to agree more strongly that pharmaceutical representatives are a valuable resource in helping physicians learn about new drugs, which accounts for these physicians’ greater reliance on pharmaceutical representatives for drug information. But, importantly, frequency of giving drug samples remains independently associated with the dependent variable. This implies that greater prescribing of drug samples is associated with greater reliance on pharmaceutical representatives for information when making prescribing decisions over and above the extent to which it is merited by

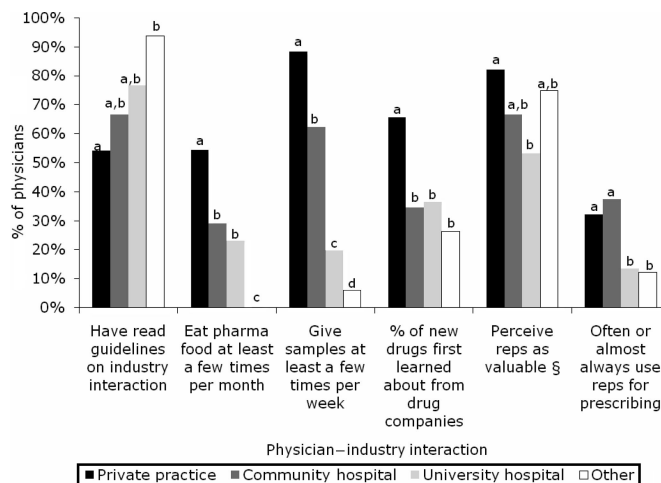


Figure 2 Physician–industry interaction by practice setting as reported in a 2006–2007 survey of 251 members of the American College of Obstetricians and Gynecologists’ Collaborative Ambulatory Research Network. This figure shows industry interaction, self-reported by physicians, broken down by practice type. Letter labels indicate post hoc, Bonferroni-adjusted, pairwise comparisons. For each variable, bars that do not share any letters are significantly different from each other at the Bonferroni-adjusted $P < .05$ level. Continuous variables are dichotomized here for ease of interpretation. However, differences between means were tested using the original, full measures. “Other” practice settings include military and government hospitals, HMOs, and nonprofit clinics.

§ Indicates agreement that “pharmaceutical representatives are a valuable resource in helping physicians learn about new drugs”: a response of 1 or greater on a scale of –5 (strongly disagree) to 5 (strongly agree).

the physician’s *own* beliefs about the value of pharmaceutical representatives. This is shown in Figure 3.

Discussion

Despite increasing attention to the ways in which aggressive marketing can shift prescribing away from evidence-based

first-line choices, more than three quarters of the physicians in our study indicated that they find pharmaceutical sales representatives to be valuable to some extent in helping them learn about new drugs, and nearly one third of the participants report using sales representatives often or almost always when deciding whether to prescribe a

new drug. Those who rely more frequently on sales representatives when deciding whether to prescribe a new drug are more likely than others to look for drug information in pharmaceutical company brochures and other advertising and less likely to seek out more objective sources such as journal articles or online resources. Ob-gyns in our sample first learned directly from drug companies about the majority of the new medications that they prescribed last year.

Attitudes toward and interactions with industry are similar among men and women, recent medical school graduates, and more senior physicians. However, they vary significantly across practice settings, with physicians at university hospitals tending to be more skeptical of and less exposed to pharmaceutical marketing practices, while those in private practice report greater day-to-day involvement with sales representatives and reliance on companies for help with prescribing. While we do not have sufficient statistical power to make conclusions about physicians practicing in HMOs, military and government hospitals, or nonprofit clinics, these participants combined into one group appear similar to university physicians in their lower levels of interaction with and lower dependence on sales representatives. There are a variety of factors that may account for these differences across settings. First, private practice physicians are generally not

Table 3

Multivariate Linear Regression Models of Reliance on Pharmaceutical Representatives for Prescribing New Drugs as Reported by 251 Members of the American College of Obstetricians and Gynecologists’ Collaborative Ambulatory Research Network Who Completed a Survey About Physician–Pharmaceutical Industry Interactions in 2006–2007

Questionnaire item	β (95% CI)		
	Model 1 ($R^2 = 0.13$)*	Model 2 ($R^2 = 0.23$)*	Model 3 ($R^2 = 0.46$)*
Read guidelines	–0.04 (–0.10 to 0.02)	–0.03 (–0.09 to 0.03)	–0.03 (–0.08 to 0.02)
Practice setting†			
Private practice	0.20 (0.11 to 0.29)*	0.04 (–0.07 to 0.15)	–0.01 (–0.10 to 0.08)
Community hospital	0.19 (0.07 to 0.31)*	0.11 (–0.01 to 0.23)	0.08 (–0.03 to 0.18)
Other setting	–0.04 (–0.18 to 0.10)	0.03 (–0.10 to 0.17)	–0.08 (–0.20 to 0.03)
Eat food‡		0.16 (0.02 to 0.31)*	0.07 (–0.06 to 0.19)
Give samples‡		0.24 (0.13 to 0.36)*	0.16 (0.06 to 0.26)*
Perceived value of reps‡			0.55 (0.44 to 0.66)*

* $P < .05$.

† University hospital is not listed because it was the reference; private practice, community hospital, and other setting were compared with university hospital.

‡ All nondichotomous variables were rescaled to range from 0 to 1.

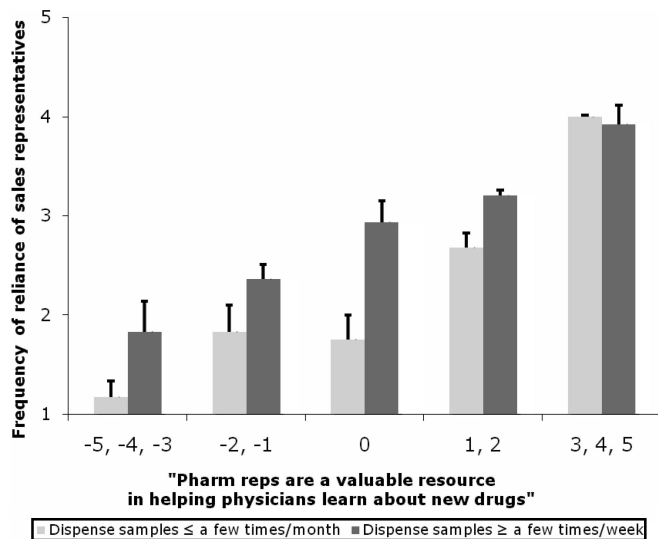


Figure 3 Reliance on sales representatives by frequency of dispensing samples and perceived value of representatives as reported in a 2006–2007 survey of 251 members of the American College of Obstetricians and Gynecologists' Collaborative Ambulatory Research Network. The y-axis is frequency of reliance on sales representatives (1 = almost never and 5 = almost always), and the x-axis is a rating from –5 (strongly disagree) to 5 (strongly agree) about whether pharmaceutical representatives are a valuable resource in helping physicians learn about new drugs. Greater prescribing of drug samples is associated with greater reliance on pharmaceutical representatives for information when making prescribing decisions over and above the extent to which it is merited by the physician's own beliefs about the value of pharmaceutical representatives.

subject to institutional restrictions on industry interactions, which appear to be increasingly common at academic medical centers. Second, those in private practice may feel more professionally isolated and so turn to sales representatives in place of colleagues to discuss clinical issues or as a social connection and source of relief in the midst of a long day of seeing patients.¹⁸ Finally, there are cultural differences; what is seen as appropriate, beneficial, and well deserved in one setting may be seen as quite the opposite in another.

While reliance on sales representatives for drug information does vary by practice setting, these differences are accounted for by the frequency with which physicians receive food and samples from drug companies. That is, physicians in private practice tend to eat industry-funded food and give drug samples to patients more frequently than those in other settings. And it is the physicians that receive more of these tangible benefits—regardless of practice setting—who more often use sales representatives for help when deciding whether to prescribe a new drug.

It is striking that prescribing samples is associated with greater reliance on sales

representatives for drug information even after controlling for the extent to which participants believe that representatives are a valuable resource in helping physicians learn about new drugs. Even among physicians who strongly disagree that sales representatives are a valuable information resource, those who receive more drug samples tend to rely on sales representatives more often for drug information. This may imply that prescribing drug samples may be associated with physicians' use of information from sales representatives more than is merited by physicians' own beliefs about the value of pharmaceutical representatives. Previous studies have found that the availability of samples can lead physicians to prescribe more expensive, newer drugs in place of cheaper drugs that are as effective and have better-established safety records, resulting in increased out-of-pocket costs for patients who receive samples and more second-line rather than first-line prescriptions.^{8,19–23} If samples are, in addition, especially powerful in breaking the barrier between a skeptical physician and marketing information, then it is ironic that patients and doctors generally perceive samples as more acceptable than other gifts.^{16,24–26}

When interpreting these results, it is important to keep in mind the limitations of the study. Although we randomly sampled from a nationally representative database of ob-gyns, the 49% response rate raises the question of generalizability. While responders and nonresponders are similar in their geographic distribution, responders are 3.5 years older, on average, than nonresponders and are, correspondingly (in the ob-gyn population), more likely to be male. However, we found that age and gender were not associated with industry attitudes and interaction. It is, therefore, less likely that self-selection into the study substantively affected the results. Second, because of the cross-sectional and observational nature of the study, we cannot make strong causal claims. Rather, our purpose is to highlight the nature and prevalence of industry relationships and examine the associations that might help explain reliance on sales representatives for drug information. Finally, these data are self-reported by physicians and are therefore subject to biases in recall and the impulse to report socially desirable behavior, even in an anonymous survey such as this. Avorn and colleagues²⁷ have found that physicians underreport reliance on commercial sources relative to scientific sources of drug information. Nonetheless, physicians reported a remarkably high degree of industry reliance in this study. Furthermore, the measure of dependence on sales representatives for drug information demonstrates both discriminant validity (its negative association with reliance on journal articles) and convergent validity (its positive association with reliance on pharmaceutical brochures and other advertisements as well as with the belief that sales representatives are a valuable informational resource).

Regarding potential remedies, it is important to consider what has already been tried. The AMA first adopted its "Guidelines on gifts to physicians from industry" in 1990, and ACOG issued its guidelines on "Relationships with industry" in 2004.^{12,13} Both of these documents have been updated since their original publication. Considering the attention focused on physician–industry interactions in recent years, we expected

to see an increase in physicians' awareness and knowledge of physician–industry guidelines. However, this was not the case. Whereas Gibbons et al²⁴ reported that 62% of physicians were aware of these ethical guidelines in 1998 and Morgan et al¹⁶ reported that 66% of ob-gyns were familiar with ACOG ethical guidelines in 2006, only 62% of physicians in the present study reported that they had read any guidelines addressing this issue.

Yet, given that most ob-gyns have read at least one set of guidelines on industry relations, it may be surprising to see such extensive involvement with sales representatives. What effect have guidelines had? Though this study is not equipped to fully answer that question, those who have read guidelines do rely less than others on sales representatives for drug information. However, this finding seems to be limited to those who have read the guidelines of their workplaces (which, in many cases, may be binding policies). Furthermore, the association is accounted for by practice setting. That is, physicians who have read guidelines are more likely to practice in university hospitals or other institutions where there may be restrictive policies rather than in private practice. Within the same type of practice setting, however, we do not find a significant difference in reliance on sales representatives between those who have read guidelines and those who have not.

This lack of association may be explained, in part, by what the guidelines say and do not say. Many guidelines on industry interaction are fairly weak in their recommendations. The AMA guidelines, for example, state that gifts and modest meals funded by pharmaceutical companies are appropriate so long as they serve an educational function; there is no discussion of limiting samples for patients or contact with sales agents. The new ACOG guidelines of 2008, by contrast, do acknowledge the influence of samples and even small gifts and meals on prescribing. They say that physicians “should not base decisions solely or primarily on information provided by the products' marketers,” pointing out that this literature has been “carefully

produced or promoted to advocate use of their products.”¹² However, they stop short of recommending against accepting samples, eating meals provided by the industry, or meeting with sales representatives; rather, they caution physicians to be aware of the potential influences.

Our data do not imply that guidelines have been ineffective. In a previous study, 61% of ob-gyns reported changing their practice based on ACOG guidelines (though not specifically based on the industry relations guidelines).¹⁵ Physicians may have changed their interactions with industry in ways not measured by this survey. What guidelines have certainly established are the positions of professional societies and related organizations that steer the direction of medicine. As these guidelines become more comprehensive and explicit in their recommendations and are implemented as policy at academic medical centers, community hospitals, and health insurance plans, we may see a cultural shift across medicine that leads to reduced reliance on pharmaceutical marketing for assistance with prescribing decisions.

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