

Effect of Restricting Contact Between Pharmaceutical Company Representatives and Internal Medicine Residents on Posttraining Attitudes and Behavior

Brendan B. McCormick, MD

George Tomlinson, PhD

Patrick Brill-Edwards, MD

Allan S. Detsky, MD, PhD

IN RECENT YEARS THE LITERATURE ON the relationship between physicians and the pharmaceutical industry has moved from being based primarily on strongly held opinions to one offering data to test hypotheses. There is recent evidence showing that information conveyed to physicians by pharmaceutical company representatives (PCRs) is selected, favorable to the product, and in some cases inaccurate.¹⁻³ A number of observational studies have shown that the prescribing behavior of physicians can be affected by gifts and other incentives from the pharmaceutical industry.⁴ Orłowski and Wateska⁵ demonstrated in a cohort study that physicians were more likely to prescribe 2 new drugs after attending an all-expenses-paid symposium at a luxury resort. Chren and Landefeld⁶ have shown that physicians who request that new drugs be added to hospital formularies are significantly more likely to have accepted money to attend or speak at symposiums, or to have performed research involving the drugs than those who do not make such requests.

The promotional activities of PCRs are of special concern to medical educators. Internal medicine residents have been reported to have extensive contact with PCRs, similar to that of practicing

Context The long-term effect of policies restricting contact between residents and pharmaceutical company representatives (PCRs) during internal medicine training is unknown. The McMaster University Department of Medicine in Hamilton, Ontario, implemented a policy restricting PCR contact with trainees in 1992, whereas the Department of Medicine at the University of Toronto, Toronto, Ontario, has no such policy.

Objective To determine if the presence of a restrictive policy and the frequency of contact with PCRs during internal medicine training predict attitudes and behavior several years after completion of training.

Design, Setting, and Participants Retrospective analysis of the attitudes and behavior of 3 cohorts of physicians: University of Toronto trainees, prepolicy McMaster trainees, and postpolicy McMaster trainees. Surveys were mailed to 242 former University of Toronto and 57 former McMaster trainees who completed their internal medicine training between 1990 and 1996, with response rates of 163 (67%) and 42 (74%), respectively.

Main Outcome Measures Physician attitude, assessed by a question about the perceived helpfulness of PCR information, and behavior, assessed by whether physicians met with PCRs in the office and the frequency of contacts with PCRs (current contact score, consisting of conversations with PCRs, PCR-sponsored events attended, gifts, honoraria, and consulting fees received).

Results In both the unadjusted and multiple regression analyses, postpolicy McMaster trainees were less likely to find information from PCRs beneficial in guiding their practice compared with Toronto and prepolicy McMaster trainees, with unadjusted odds ratios (ORs) of 0.44 (95% confidence interval [CI], 0.20-0.94) and 0.39 (95% CI, 0.13-1.22), respectively. All 3 groups were equally likely to report that they met with PCRs in their office in the past year (88%). Postpolicy McMaster trainees had a lower current contact score compared with Toronto (9.3 vs 10.9; $P=.04$) and prepolicy McMaster trainees (9.3 vs 10.8; $P=.18$). In multiple regression models, greater frequency of contact with PCRs during training was a predictor of increased perceived benefit of PCR information (OR, 1.29; 95% CI, 1.13-1.47) and was positively correlated with the current contact score (partial $r=0.49$; $P<.001$). Number of PCR-sponsored rounds attended during training was not a consistent predictor of attitudes or behavior.

Conclusions Policies restricting PCR access to internal medicine trainees and the amount of contact during residency appear to affect future attitudes and behavior of physicians.

JAMA. 2001;286:1994-1999

www.jama.com

physicians.⁷ A survey of 272 internal medicine program directors revealed that 45% were moderately or very concerned about adverse effects of pharma-

Author Affiliations and Financial Disclosures are listed at the end of this article.

Corresponding Author and Reprints: Allan S. Detsky, MD, PhD, Mount Sinai Hospital, 600 University Ave, Room 427, Toronto, Ontario, Canada M5G 1X5 (e-mail: detsky@utstat.toronto.edu).

ceutical industry exposure on resident prescribing and attitudes. Despite this, only 35% of programs had policies regulating interactions between residents and PCRs.⁸ Even fewer (25%) had formal instruction on how to interact with PCRs. One likely explanation for the reluctance of residency program committees to curtail PCR marketing in their programs is that they rely on industry funding for sponsoring educational rounds, research, and conference travel, and because there is a belief that this funding is contingent upon access to residents. Another explanation is that programs seek to expose their residents to pharmaceutical industry marketing during their training so as to prepare them for future practice.

A number of investigators have examined the relationship between the presence of educational and departmental policies limiting contact with PCRs and resident attitudes toward PCRs.⁹⁻¹¹ Their results indicate that restrictive departmental policies are associated with less favorable attitudes toward the value of interaction with PCRs. No studies have examined whether these attitudes are maintained once residents complete their training.

In 1992 the Education Committee of the Internal Medicine Residency Program at McMaster University in Hamilton, Ontario, implemented a policy that restricted resident interactions with PCRs during daytime hospital activities. In particular, PCRs were barred from attending educational events, drug lunches were ended, and funding from the industry was refused if it was tied to specific conditions.¹² Although initially the subject of considerable controversy,^{13,14} these guidelines have been successfully followed and maintained.

In contrast to the restrictive policy at McMaster University, the University of Toronto's Internal Medicine Residency Program has no explicit policy on resident interaction with the pharmaceutical industry. The philosophy in Toronto is to teach critical appraisal skills and allow residents to assess PCR claims on an individual basis. Internal medicine residents at Toronto are free

to meet with PCRs and PCRs are free to sponsor events. This has resulted in regular industry sponsorship of educational rounds, residents attending out-of-hospital educational and social events sponsored by PCRs, and the giving of gifts from PCRs to residents.

Hamilton and Toronto are approximately 80 km apart and recruit their residents from the same pool of graduating medical students. The program in Toronto is larger than the McMaster program with approximately 4 times as many residents, but there are no recognized inherent differences in the trainee populations. Thus, the different policies in 2 academic centers that are in many ways similar provide for an opportunity to assess the effect of a restrictive policy during general internal medicine training on future physician interactions with PCRs.

The primary question that we posed was whether a policy restricting PCR contact with residents during general internal medicine training predicted attitudes and behavior once a trainee became a practicing physician. The secondary question was whether the extent of contact with PCRs during residency independently predicted future attitudes and behavior.

METHODS

Participants

With the assistance of the current internal medicine program directors in Toronto and Hamilton, the names of all third-year core internal medicine trainees from 1990 through 1996 were obtained. This period was chosen because it encompassed the time 3 years before and 4 years after the implementation of the McMaster policy. Toronto did not have a formal policy regulating contact with the pharmaceutical industry at any time during the period of interest. It was anticipated that most of the participants would have completed their subspecialty training and be practicing during the time period the study was conducted.

The *Canadian Medical Directory*¹⁵ was used to obtain the mailing addresses of those physicians identified by the office of the program director. The di-

rectory is a comprehensive listing of all physicians practicing in Canada and is updated yearly. An initial mailing was performed in February 1999 to those with addresses available in the 1998 directory. A follow-up mailing to nonresponders occurred after addresses were checked against the 1999 directory.

The Survey

A survey instrument was designed to elicit information about a physician's current contact with and attitude toward PCRs, as well their recollection of contact with PCRs during general internal medicine training. The survey consisted of 3 parts: (1) 8 questions that elicited demographic information, including information about the site of training and current area of practice; (2) 9 questions asking participants to recall the frequency of their involvement with PCRs during their 3 years of general internal medicine training; and (3) series of questions regarding their current attitudes and behavior. Participants were questioned in the second part of the survey about their frequency of volitional contact with PCRs via conversations, gifts (books, equipment) accepted, and out-of-hospital meals and social events attended. This part also contained questions about the number of PCR-sponsored educational rounds attended. Attendance at these rounds is usually considered a mandatory component of training and thus is not considered elective on the part of the resident. The third part of the survey contained a question about attitude toward the usefulness of information from PCRs (5-item scale), a question about whether they currently see PCRs (yes/no), and a series of questions about the frequency of certain contact with PCRs. These contacts included conversations with PCRs, out-of-hospital meals and social events, honoraria, consulting fees, and gifts received. These contacts were chosen so as to stratify physicians based on their extent of involvement with the industry. They were selected based on a review of the relevant literature^{4-7,16} and solicitation of expert opinion.

The survey was pretested on a sample group of 8 physicians to assess for am-

Table. Demographics of Toronto, Prepolicy McMaster, and Postpolicy McMaster Trainees*

Characteristics, No. (%)	Toronto (n = 157)	Prepolicy McMaster (n = 17)	Postpolicy McMaster (n = 25)	P Value
Sex				
Female	55 (35)	6 (35)	12 (48)	.46
Male	102 (65)	11 (65)	13 (52)	
Respondents identified as				
General internist	26 (17)	1 (6)	8 (32)	.07
Other	131 (83)	16 (94)	17 (68)	
Academic practice	93 (64)	7 (41)	17 (71)	.12

*A total of 13 respondents did not indicate if in academic practice. P values were calculated using χ^2 test.

biguity, appropriateness of data ranges, and perception of biased or leading questions. The survey was amended appropriately. The protocol and survey were approved by the research ethics committee at the University of Toronto.

Statistical Analysis

Statistical models were derived to answer the following questions: Does policy during training predict post-training attitudes and behavior? Does the frequency of contact with PCRs during training predict posttraining attitudes and behavior?

For the purposes of the model, 3 predictors and 3 outcomes were identified. The predictors were (1) departmental policy during training; (2) estimated number of industry-sponsored rounds attended during training; and (3) estimated total amount of volitional contact during training calculated as a summary score from the answers to questions in the second part of the survey. The first predictor provided for 3 groups: McMaster prepolicy, McMaster postpolicy, and Toronto. McMaster trainees were divided into prepolicy and postpolicy groups based on completion of the third residency year. Those who completed their third residency year in 1992 or earlier had done the majority of their training prior to the new policy, whereas those completing their third residency year subsequent to 1992 had done a substantial amount of or all of their training under the new policy. The second predictor was treated as a continuous variable equal to the midpoint of the range of the reported number of industry-sponsored rounds attended per year. It was transformed to a base 2 logarithm

for the purposes of analysis. Conversations with PCRs, gifts from PCRs (equipment and books), out-of-hospital meals, and out-of-hospital social events were all given equal weighting for the third predictor. Responses to each of the 4 questions were divided into tertiles, the lowest tertile being assigned a score of 1 and the highest, 3. These 4 scores were summed to give a score between 4 and 12, which was treated as a continuous variable.

The outcomes identified were (1) How useful does the physician find pharmaceutical industry information in guiding practice? (2) Does the physician see PCRs in his/her office? and (3) What current contact does the physician have with PCRs? The first attitudinal outcome was scored on a 5-point scale ranging from "never useful" to "always useful" and was analyzed as an ordered category. The second outcome's yes/no answer was a behavioral outcome and was analyzed as a binary variable. The third outcome summary variable was calculated from the 6 ordered answers to questions from part 3 of the survey, using the method described above for the amount of volitional conduct during training. Equal weighting was given to conversations with PCRs, out-of-hospital meals, out-of-hospital social events, honoraria, consulting fees, and gifts received. These 6 questions gave a score between 6 (lowest tertile on all questions) and 18 (highest tertile on all questions).

First policy alone was examined in an unadjusted model, then all 3 predictors were examined in multiple regression models: (1) perceived helpfulness of PCR information = $f(\text{policy})$ and $f(\text{policy}, \log_2 \text{ number of sponsored rounds attended,}$

amount of volitional contact), analyzed using ordinal regression with a proportional odds model; (2) likelihood of seeing PCR in office = $f(\text{policy})$ and $f(\text{policy}, \log_2 \text{ number of sponsored rounds attended, amount of volitional contact),}$ analyzed using logistic regression; and (3) current contact = $f(\text{policy})$ and $f(\text{policy}, \log_2 \text{ number of sponsored rounds attended, amount of volitional contact),}$ analyzed using linear regression. Those who declined to answer or answered "I don't know" were not included in the analysis.

The approach we have taken is hypothesis testing rather than hypothesis generating. Each of the 3 functional relationships relating 3 predictors to each of 3 outcomes shows our a priori hypotheses. We report the results of these regressions including all predictors regardless of whether the estimates of the coefficients are statistically significant as a test of hypothesized models. We recognize that the predictors may be correlated. The correct way to handle this colinearity in order to lead to unbiased estimates of the coefficients is to include all variables in the regressions rather than excluding some variables. SPPLUS 2000 for Windows (Professional Release) software (Insightful Corporation, Seattle, Wash) was used for the statistical analyses. A χ^2 test was used to calculate P values, with less than .05 required to determine statistical significance.

RESULTS

Response Rate

From 1990 to 1996, 242 Toronto trainees and 57 McMaster trainees were identified and had current addresses available in the *Canadian Medical Directory*. After 2 mailings, completed surveys were received from 163 (67%) of the Toronto trainees and 42 (74%) of the McMaster trainees for a total response rate of 69% before exclusions. Six Toronto surveys were completely excluded from analysis because of incomplete data.

Demographic Data

Demographic data are shown in the TABLE. McMaster postpolicy trainees

were more likely to be female, involved in academic practice, and more likely to identify themselves as a general internist compared with prepolicy McMaster and Toronto trainees. These differences were not statistically significant.

Effect of Restrictive Policy: Unadjusted Analysis

The McMaster policy was successful in reducing the number of industry-sponsored rounds attended during training. FIGURE 1 illustrates the range and distribution for this variable for the 3 cohorts. The mean number of reported rounds per month and per year both fell, although only the change in number per month was significant. The mean number of industry-sponsored rounds per month fell from 2.9 prepolicy to 1.4 postpolicy ($P=.02$). Frequency of volitional contact with PCRs was reduced but not significantly with a mean contact score of 6.6 among the prepolicy group and 6.0 among the postpolicy group ($P=.41$) (FIGURE 2).

A restrictive policy predicted less favorable attitudes toward information from PCRs. As shown in FIGURE 3, postpolicy McMaster graduates were significantly less likely to find PCR information helpful in guiding their practice compared with Toronto graduates, with an odds ratio (OR) of 0.44 (95% confidence interval [CI], 0.20-0.94) for being in a higher category. This OR has the following interpretation. Consider any split of the favorable attitude scale into 2 groups (eg, never or rarely vs sometimes, often, or always). The odds that a postpolicy McMaster graduate is in the more favorable group (eg, sometimes, often, or always) is only 0.44 times the odds that a Toronto graduate is in the more favorable group. There was a similar trend comparing postpolicy with prepolicy McMaster graduates, with an OR of 0.39 (95% CI, 0.13-1.22). Prepolicy McMaster graduates compared with Toronto graduates had an OR of 1.12 (95% CI, 0.44-2.83). A restrictive policy did not predict whether a physician would be more or less likely to see PCRs in his or her office. In all 3 groups, 88% of physicians reported that they had met

with a PCR in their office in the past year.

As shown in FIGURE 4, postpolicy McMaster graduates had a significantly lower mean current contact score compared with Toronto graduates (9.3 vs 10.9, $P=.04$). A similar trend was also noted for postpolicy vs prepolicy McMaster trainees (9.3 vs 10.8, $P=.18$).

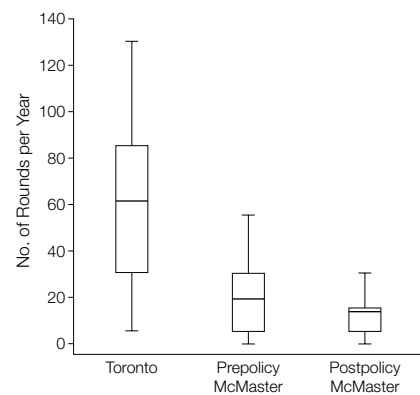
Multiple Regression Analysis

Restrictive Policy. In the multiple regression analysis, policy during training remained a significant independent predictor of perceived benefit of PCR information, with an OR of 0.37 (95% CI, 0.14-0.96) for the prepolicy McMaster group vs the Toronto group, and an OR of 0.38 (95% CI, 0.12-1.25) for the postpolicy vs prepolicy McMaster groups. Contact score was 1.58 (current contact score) units lower in the postpolicy McMaster group than the Toronto group ($P=.04$), and 1.14 units lower than in the prepolicy McMaster group ($P=.23$) in the multiple regression model. The OR of contact with PCRs was not significantly different among the 3 groups in this model (2.50; 95% CI, 0.52-12.00 for postpolicy McMaster vs Toronto; 1.02; 95% CI, 0.14-7.16 for postpolicy vs prepolicy McMaster).

Effect of Contact. Increased volitional contact during residency predicted increased perceived benefit of PCR information, with an OR of 1.29 (95% CI, 1.13-1.47). This indicates that a respondent reporting the highest frequency of volitional contact during residency (score, 12) has an OR of 7.67 (95% CI, 2.66-21.80) of finding PCR information more helpful compared with a respondent who reported the lowest volitional contact during residency (score, 4). Volitional contact did not predict whether a physician sees PCRs in his or her office (OR, 0.83; 95% CI, 0.66-1.05). It was, however, strongly correlated with the current contact score (partial $r=0.49$ from multiple regression; $P<.001$).

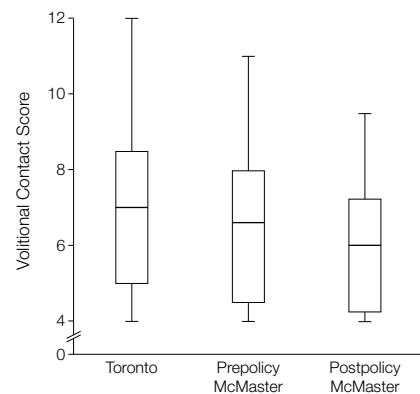
The number of rounds attended during training was not a reliable predictor of attitudes or behavior. Increased number of rounds was not a significant predictor of perceived benefit of

Figure 1. Reported Number of Pharmaceutical Company Representative–Sponsored Rounds Attended During Training of 3 Cohorts



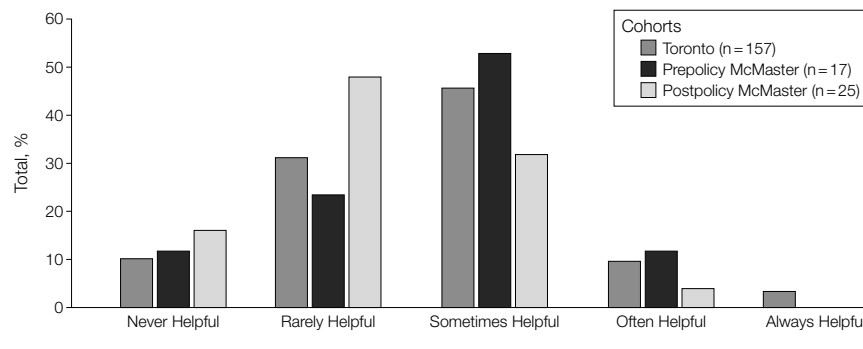
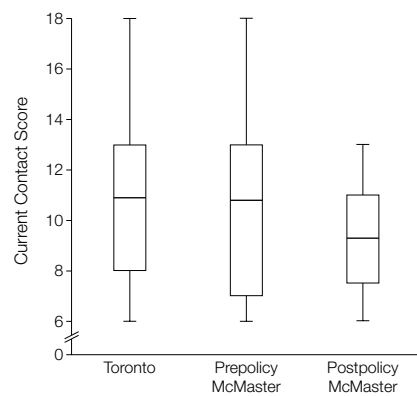
Data are shown with range (error bars), 25th to 75th percentiles (boxes), and mean (horizontal bar). Difference of means of prepolicy vs postpolicy McMaster equals 5.5 (95% confidence interval, -4.5 to 15.6).

Figure 2. Volitional Contact Score During Training of 3 Cohorts



Data are shown with range (error bars), 25th to 75th percentiles (boxes), and mean (horizontal bar). Difference of means of prepolicy vs postpolicy McMaster equals 0.6 (95% confidence interval, -0.82 to 1.95).

PCR information (OR, 0.87; 95% CI, 0.70-1.09). Increased number of rounds attended during training was a significant predictor of whether a physician reported seeing PCRs in his or her office (OR, 1.61; 95% CI, 1.05-2.47). However, the direction of the relationship was the opposite of what we expected, predicting slightly decreased current contact of 0.36 with a doubling of the number of rounds derived from the multiple regression.

Figure 3. Perceived Benefit of Pharmaceutical Company Representative Information of 3 Cohorts**Figure 4.** Current Contact Score of 3 Cohorts

Data are shown with range (error bars), 25th to 75th percentiles (boxes), and mean (horizontal bar).

COMMENT

This study assessed whether a policy limiting contact between internal medicine residents and PCRs predicts physician attitudes or behavior once training is completed. The results indicate that the attitude toward PCR information is less favorable among those who trained under a restrictive policy. The multiple regression analysis shows that the policy has an effect on posttraining attitudes, even when the other 2 predictors (number of rounds and volitional contact with PCRs during training) are included in the model. However, because the latter 2 predictors are both correlated with the policy variable, a problem known as multicollinearity, it is impossible to determine

whether the policy per se or the decreased contact is the reason for the posttraining attitudinal effect.

Thus, one could attribute the success of the McMaster policy to decreased contact since the policy gave rise to a trend toward decreased volitional contact with PCRs during training, which in turn predicted a less favorable attitude. Additionally, one could surmise that the educational environment created by the McMaster policy, as well as strong faculty opinions, may have molded more critical attitudes at a formative stage. It could also be argued that postpolicy McMaster trainees never learned how to interact in a constructive manner with PCRs and thus are unable to find them helpful. One should also consider the possibility that a well-designed educational intervention alone may be as effective in formulating attitudes toward the pharmaceutical industry without being restrictive.

Our finding that a restrictive policy during training does not predict whether a physician sees PCRs in his or her office is similar to a finding reported in a recent US study.¹⁷ It was correctly anticipated at the outset of this study that seeing PCRs in the office, treated as a dichotomous variable (never/ever), may not be a sensitive enough measure to assess for behavioral influence of policy during training, especially given that the vast majority of physicians in Ontario regularly see PCRs.¹⁸ For practicing physicians, greater frequency of contact with

PCRs was predicted by the absence of a restrictive policy. Although the presence of a restrictive policy during training does not appear to affect the probability that a physician will ever see PCRs, it does appear to reduce the frequency of contact with the industry as a practicing physician.

The most important issue for medical educators is whether permitting or restricting contact with PCRs during residency training affects future prescribing behavior. This study does not address this issue. Some published studies document the relation between contact with the industry and inappropriate prescribing behavior.^{4,19} However, it is possible that studies that showed no relationship have not been published and we do not believe that all contact with industry results in inappropriate prescribing. We believe there are many circumstances where effective and efficient strategies involving pharmaceutical products are underutilized (eg, treatment of hypertension in the 1970s, thrombolysis for acute myocardial infarction in the 1980s, secondary prevention of coronary artery disease by reducing cholesterol, and anticoagulation for atrial fibrillation in the 1990s) where marketing by pharmaceutical companies plays an important role in improving outcomes for patients.

A major limitation in this study was the self-reported nature of the data. The response rate of 69% was as good or better than many studies surveying physicians on this sensitive subject.^{17,20,21} Similar to all surveys examining remote events, ours was subject to recall bias. This recall bias had the potential to confound our results if a respondent systemically overreported or underreported contacts with PCRs as both a resident and practicing physician. This could potentially weaken our conclusions about the predictive value of volitional contact with PCRs as a resident. It does not, however, affect our conclusions about predictive value of policy during training as this was not subject to recall bias.

An additional limitation is that the score for volitional contact with PCRs

during training and the current contact score have not been validated. When designing this study, we could find no examples of validated scores in the literature. Our review of the literature did reveal a number of behaviors that are possible markers for proximity to the pharmaceutical industry and we designed our scores based on these behaviors.^{4-7,16}

Our findings have implications for both residency training programs and pharmaceutical companies. For those program directors who explicitly seek to affect the future behavior and attitudes of their trainees once they leave residency, this study shows that the

objective can be achieved by restricting PCR contact with residents during training. For pharmaceutical companies, this study shows that they can achieve their objective of increasing contact with practicing physicians once they leave training by investing in PCR contact with residents. In our opinion, whether this contact truly produces net harm or net benefit from a societal perspective is not entirely clear.

Author Affiliations: University of Toronto, Departments of Health Policy, Management, and Evaluation, and Medicine, Department of Medicine, Mount Sinai Hospital and University Health Network, Toronto (Drs McCormick, Tomlinson, and Detsky); and De-

partment of Medicine, McMaster University, Hamilton (Dr Brill-Edwards), Ontario.

Financial Disclosure: This study received no external financial support. Dr McCormick has attended numerous in- and out-of-hospital educational events sponsored by pharmaceutical manufacturers. Dr Detsky has in the past received honoraria, consulting fees, and research grants from pharmaceutical manufacturers. Dr Brill-Edwards has also received honoraria from pharmaceutical manufacturers.

Author Contributions: *Study concept and design:* McCormick, Detsky.

Acquisition of data: McCormick, Brill-Edwards, Detsky. *Analysis and interpretation of data:* McCormick, Tomlinson, Detsky.

Drafting of the manuscript: McCormick, Detsky.

Critical revision of the manuscript for important intellectual content: McCormick, Tomlinson, Brill-Edwards, Detsky.

Statistical expertise: Tomlinson, Detsky.

Obtained funding: Detsky.

Administrative, technical, or material support: Brill-Edwards, Detsky.

Study supervision: Detsky.

REFERENCES

- Ziegler MG, Lew P, Singer BC. The accuracy of drug information from pharmaceutical sales representatives. *JAMA*. 1995;273:1296-1298.
- Stryer D, Bero LA. Characteristics of materials distributed by drug companies: an evaluation of appropriateness. *J Gen Intern Med*. 1996;11:575-583.
- Lexchin J. What information do physicians receive from pharmaceutical representatives? *Can Fam Physician*. 1997;43:941-945.
- Wazana A. Physicians and the pharmaceutical industry: is a gift ever just a gift? *JAMA*. 2000;283:373-380.
- Orlowski JP, Wateska L. The effects of pharmaceutical firm enticements on physician prescribing patterns: there's no such thing as a free lunch. *Chest*. 1992;102:270-273.
- Chren MM, Landefeld CS. Physicians' behavior and their interactions with drug companies: a controlled study of physicians who requested additions to a hospital drug formulary. *JAMA*. 1994;271:684-689.
- Lurie N, Rich EC, Simpson DE, et al. Pharmaceutical representatives in academic medical centers. *J Gen Intern Med*. 1990;5:240-243.
- Lichstein PR, Turner RC, O'Brien K. Impact of pharmaceutical company representatives on internal medicine residency programs. *Arch Intern Med*. 1992;152:1009-1013.
- Sergeant MD, Hodgetts PG, Godwin M, Walker DM, McHenry P. Interactions with the pharmaceutical industry: a survey of family medicine residents in Ontario. *CMAJ*. 1996;155:1243-1248.
- Brontzman GL, Mark DH. The effect of resident attitudes of regulatory policies regarding pharmaceutical representative activities. *J Gen Intern Med*. 1993;8:130-134.
- Hopper JA, Speece MW, Musial JL. Effects of an educational intervention on residents knowledge and attitudes toward interactions with pharmaceutical representatives. *J Gen Intern Med*. 1997;12:639-642.
- Education Council, Residency Training Programme in Internal Medicine, Department of Medicine, McMaster University, Hamilton, Ontario. Development of residency program guidelines for interaction with the pharmaceutical industry. *CMAJ*. 1993;149:405-408.
- Guyatt G. Academic medicine and the pharmaceutical industry: a cautionary tale. *CMAJ*. 1994;150:951-953.
- Erola JA. We need a dialogue and discussion, not a new Berlin Wall. *CMAJ*. 1994;150:955-956.
- Canadian Medical Directory 1998 Edition*. Don Mills, Ontario: Southam Information Products Ltd; 1998.
- Stelfox HT, Chua G, O'Rourke K, Detsky AS. Conflict of interest in the debate over calcium-channel antagonists. *N Engl J Med*. 1998;338:101-106.
- Ferguson RP, Rhim E, Belzair W, Egede L, Carter K, Lansdale T. Encounters with pharmaceutical sales representatives among practicing internists. *Am J Med*. 1999;107:149-152.
- Williams AP, Cockerill R. Report on the 1989 survey of the prescribing experiences and attitudes towards prescription drugs of Ontario physicians. In: *Prescriptions for Health: Report of the Pharmaceutical Inquiry of Ontario*. Toronto: Pharmaceutical Inquiry of Ontario; 1990:1-102.
- Lexchin J. Interactions between physicians and the pharmaceutical industry: what does the literature say? *CMAJ*. 1993;149:1401-1407.
- Andaleeb SS, Tallman RF. Physician attitudes toward pharmaceutical sales representatives. *Health Care Manage Rev*. 1995;20:68-76.
- Banks JW, Mainous AG. Attitudes of medical school faculty towards gifts from the pharmaceutical industry. *Acad Med*. 1992;67:610-612.