A Physician Survey of the Effect of Drug Sample Availability on Physicians' Behavior

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OBJECTIVE: **Pharmaceutical companies often use drug samples as a marketing strategy in the ambulatory care setting. Little is known about how the availability of drug samples affects physicians' prescribing practices. Our goal was to assess: (1) under what circumstances and why physicians dispense drug samples, (2) if drug samples lead physicians to use medications other than their preferred drug choice, and (3) the physician characteristics that are associated with drug sample use.**

DESIGN: **Cross-sectional survey.**

SETTING: **University-based clinics at one academic medical center.**

PARTICIPANTS: **154 general medicine and family physicians.**

MEASUREMENTS AND MAIN RESULTS: **Physicians' self-reported prescribing patterns for 3 clinical scenarios, including their preferred drug choice, whether they would use a drug sample and subsequently prescribe the sampled medication, and the importance of factors involved in the decision to dispense a drug sample. A total of 131 (85%) of 154 physicians responded. When presented with an insured woman with an uncomplicated lower urinary tract infection, 22 (17%) respondents reported that they would dispense a drug sample; 21 (95%) of 22 sample users stated that they would dispense a drug sample that differed from their preferred drug choice. For an uninsured man with hypertension, 35 (27%) respondents reported that they would dispense a drug sample; 32 (91%) of 35 sample users indicated that they would dispense a drug sample instead of their preferred drug choice. For an uninsured woman with depression, 108 (82%) respondents reported that they would dispense a drug sample; 53 (49%) of 108 sample users indicated that they would dispense a drug sample that differed from their preferred drug choice. Avoiding cost to the patient was the most consistent motivator for dispensing a drug sample for all 3 scenarios. For 2 scenarios, residents were more likely to report using drug samples than attendings ($P < .05$). When respondents who chose a drug sample for 2 or 3 scenarios were compared to those who never chose to use a drug sample, or chose a drug sample for only one scenario, only younger age was independently associated with drug sample use.**

CONCLUSION: **In self-reports, the availability of drug samples led physicians to dispense and subsequently prescribe drugs that differ from their preferred drug choice. Physicians most often report using drug samples to avoid cost to the patient.**

KEY WORDS: **Drug samples; pharmaceutical advertisement; prescribing behavior; drug promotion.**
J GEN INTERN MED 2000;15:478–483.

Drug advertising has been shown to affect physicians' prescribing behaviors,[1–3] with an estimated $12 billion a year spent on drug advertising and marketing.[4] Pharmaceutical companies currently use a multifaceted approach to drug promotion, incorporating techniques such as hospital and office detailing by pharmaceutical representatives, direct-to-consumer advertising through television and magazines, and printed materials in journals. An important marketing technique commonly used by pharmaceutical companies is distribution of free drug samples. Although the clinical use of samples is common in many ambulatory care settings, little has been published about how this practice affects physicians' prescribing habits.

Attitudes regarding the clinical use of drug samples are conflicting. The availability of drug samples can benefit patients by allowing physicians to initiate therapy immediately, evaluate early effectiveness or adverse effects, adjust prescribed doses before the full prescription is purchased by the patient, offset the cost of drugs for indigent patients, and demonstrate the appropriate use to patients.[5] On the other hand, drug samples may promote poor habits among physicians, encouraging disregard of evidence-based guidelines or prescribing of products not on hospital or managed care formularies. Furthermore, when physicians dispense drug samples, patients might not have the benefit of pharmacy counseling about medication use and identification of drug-drug interactions.[6–8] Concerns have also been raised about the potential for drug samples to be diverted for resale as well as the ethical implications of personal use of drug samples by health care workers.[9]

Several organizations have developed guidelines in an attempt to encourage the appropriate use of drug samples. The Society of Teachers of Family Medicine encourages the development of protocols and programs on the use of drug samples to "help ensure that drug selection for patients is primarily based on efficacy and cost, not on the availability of samples."[10] The Joint Commission on

Received from the Department of Medicine (LDC, KAB, DSL), Department of Pharmacy (TSO, TKH), and Department of Health Services (CM), University of Washington, Harborview Medical Center, and Veterans' Administration Puget Sound Healthcare System, Seattle Division (KAB, CM), Seattle, Wash.

Presented in part at the 21st national meeting, Society of General Internal Medicine, Chicago, Ill, April 1998 and published as an abstract.

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the Accreditation of Healthcare Organizations has encouraged institutions to develop specific criteria on the storage, labeling, and distribution of drug samples.[11] Health care organizations have developed an array of policies with respect to drug samples; some practices ban drug samples, whereas others place no limits on their availability or use.

Two studies have suggested that the availability of drug samples may increase subsequent prescription of sampled drugs. Morelli and Koenigsberg inventoried drug samples in a family practice residency office and noted a high association between drug sample dispensing and simultaneous prescribing of the same brand-name drug, suggesting that sampling influences physicians' prescribing habits.[12] In a survey study of family practice residents by Shaughnessy and Bucci, 55% of respondents acknowledged that drug samples influenced their prescribing.[13] These studies provide important insight into the potential effects of providing drug samples, but they do not address when and why physicians use drug samples, or under what circumstances physicians will subsequently prescribe a medication that was initially dispensed as a drug sample.

The purpose of this study was to assess under what circumstances and why physicians dispense drug samples, whether drug samples lead physicians to use medications they would not otherwise prescribe, and the physician characteristics associated with drug sample use.

METHODS

Setting and Study Participants

We surveyed all 154 eligible practicing general medicine and family medicine physicians at 9 University of Washington-based clinic sites about their prescribing habits between May and June 1997. Physicians were eligible if they were attendings or residents in training with active continuity clinics within one of the 9 sites. We excluded teaching attendings whose primary clinic was not based at these sites because of the potential variation in clinical guidelines and physicians on a leave of absence from the studied clinics. Physicians who did not return the survey after 2 attempts to deliver questionnaires were considered nonrespondents. All responses to the survey were anonymous. The study was exempted from review by the University of Washington Human Subjects Committee.

Drug samples were available for dispensing at three of the nine clinic sites. All sites had adopted the Fifth Report of the Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure (JNC V) guideline for the treatment of hypertension which recommended diuretics and β-blockers as first-choice therapy unless they are contraindicated or there are specific indications for other agents.[14,15] A depression guideline had also been adopted but did not contain a specific drug algorithm.[16] There was no formal clinical guideline for the management of urinary tract infections (UTIs). Guidelines were distributed by the medical directors of all University of Washington affiliated medical centers to practicing physicians and made available as part of a physician decision-support "toolkit" on the medical center's website. Adherence to guidelines was left to the discretion of the individual physician.

Questionnaire

We developed a 3-part questionnaire that assessed demographic characteristics, self-reported practice patterns, and attitudes toward drug sample use (a copy of the survey instrument is available by request from LDC). The first part of the questionnaire assessed physician demographic characteristics which included age, gender, specialty (family medicine or internal medicine), continuity clinic site, resident or attending status, and whether drug samples were available at a physician's continuity clinic site. The second part of the questionnaire presented physicians with 3 clinical scenarios intended to represent prevalent outpatient conditions for which drug samples are often available. In the third part of the questionnaire, respondents were asked to rate the extent to which they agreed with 7 statements regarding their attitudes about the clinical use of drug samples from "strongly agree" to "strongly disagree" on a 5-point Likert scale. These statements regarding physicians' attitudes were chosen because they represented common views regarding the clinical use of drug samples in the available literature.[5,7,8,12] The questionnaire was pretested among nonparticipating colleagues at the University of Washington and revised to increase clarity.

The 3 clinical scenarios depicted an insured woman with an uncomplicated lower UTI, an uninsured man with essential moderate hypertension (HTN), and an uninsured woman with new onset depression. For each scenario, we first asked physicians for their preferred drug to treat the patient who had no comorbid illnesses or drug allergies and therefore, no contraindications to any medications. Physicians were then presented with a list of drug samples comprised of nongeneric, brand-name medications that were commonly available at those clinic sites that permitted the dispensing of drug samples. Physicians were asked to choose between writing a prescription for their preferred drug or dispensing a drug sample from the list. The list of initial drug and drug sample choices made available to respondents are included in Table 1. In each scenario, those who chose to dispense a drug sample were asked to identify which drug sample they would dispense and to rate on a 5-point Likert scale the importance of various factors (cost, convenience, patient satisfaction, immediate initiation of therapy, and evaluation of effectiveness) affecting their decision.

Physicians who chose to dispense a drug sample for the hypertensive patient were presented with a follow-up

Table 1. Selection of Drugs Available to Respondents

Scenario	Initial Drug Choices
Urinary tract infection	Amoxacillin/Clavulanate (Augmentin®)*
	Cefpodoxime (Vantin®)*
	Ciprofloxacin (Cipro®)*
	Amoxacillin
	Nitrofurantoin
	Trimethoprim-sulfamethoxazole (Bactrim®, Septra®)
Hypertension	Amlodipine (Norvasc®)*
	Atenolol
	Benazepril
	Diltiazem (Cardizem CD)*
	Enalapril (Vasotec®)*
	Felodipine (Plendil®)*
	Hydrochlorothiazide
	Lisinopril (Prinivil®, Zestril®)*
	Losartan (Cozaar®)*
	Metoprolol
	Nifedipine XL (Procardia®)*
	Triamterene/HCTZ (Dyazide®, Maxzide®)
Depression	Amitriptyline
	Desipramine
	Doxepin
	Fluoxetine (Prozac®)*
	Imipramine
	Nortriptyline
	Paroxetine (Paxil®)*
	Sertraline (Zoloft®)*
	Trazadone

*Drugs available as drug sample choices.
Medications were listed alphabetically in the questionnaire. Trade names were listed in questionnaire.

case; the same patient returned with well-controlled HTN on the sampled medication and now had health insurance that covered prescription costs in full. Physicians were asked to choose one of the following clinical strategies: provide the patient with more drug samples, write a prescription for the sampled medication, or write a prescription for a different medication.

Analytic Methods

Physicians were categorized as either self-reported "sample users" or "nonsample users" for each scenario based on whether or not they reported that they would dispense a drug sample. To assess if drug samples alter physicians' treatment plans, we compared self-reported sample users' preferred drugs to drug samples they reported they would dispense or prescribe. For evaluation of attitudes about drug samples, we combined those who agreed or strongly agreed with each statement and those who disagreed or strongly disagreed.

To explore physicians' characteristics associated with more frequent drug sample use, we classified respondents into two groups based on how often they reported using samples: those who used samples once or never (infrequent sample users) and those who used samples in 2 or more scenarios (frequent sample users).

The χ^2 test was used to compare dichotomous variables, and the Student's *t*-test was used for comparisons of continuous variables. We also used stepwise logistic regression to identify physician characteristics independently associated with frequent sample use (2 or more of the scenarios).

RESULTS

One hundred fifty-four questionnaires were distributed; 131 (85%) were completed and returned. Respondents were significantly less likely than nonrespondents to have access to drug samples in their actual clinical practices (Table 2).

Scenario 1: Patient with an Uncomplicated Urinary Tract Infection

Trimethoprim-sulfamethoxazole (92%), amoxacillin (7%), and ciprofloxacin (1%) were the preferred initial therapies for an uncomplicated UTI among all respondents. When drug samples were made available (Table 1), 22 (17%) of the 131 physicians stated that they would dispense ciprofloxacin as a drug sample. For 21 (95%) of the 22 self-reported sample users, ciprofloxacin was not their preferred initial therapy. About three fourths of self-reported sample users rated saving the patient a trip to the pharmacy and initiating therapy immediately as important or extremely important reasons for dispensing the drug sample. In addition, "to avoid burden of cost to the patient" was cited as an important or extremely important reason by 82% of self-reported sample users (Fig. 1).

Table 2. Characteristics of Respondents and Nonrespondents

	Respondents *n* (%)	Nonrespondents *n* (%)	*P* Value*
Total	131 (100)	23 (100)	
Mean age, y ± SD	34 ± 8.3		
Gender			.57
Male	60 (46)	12 (52)	
Female	71 (54)	11 (48)	
Specialty			.34
Internal medicine	96 (73)	19 (83)	
Family medicine	35 (27)	4 (17)	
Level of training			.21
Resident	79 (60)	17 (74)	
Attending	52 (40)	6 (26)	
Access to samples in clinic			.01
Yes	54 (41)	16 (70)	
No	77 (59)	7 (30)	

*For comparison of respondents to nonrespondents.

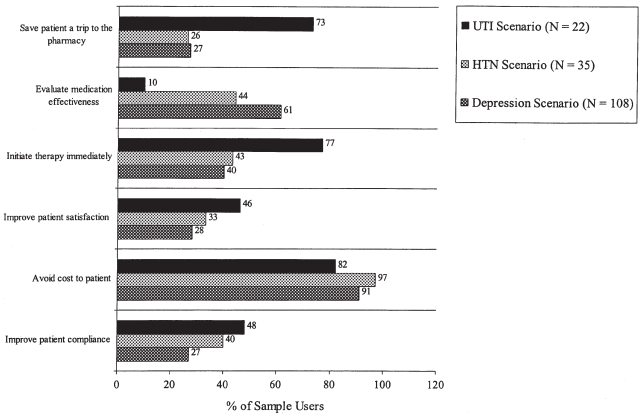

FIGURE 1. Important or extremely important factors for dispensing a drug sample among sample users. UTI indicates urinary tract infection. HTN indicates hypertension.

Scenario 2: Patient with Hypertension

To treat an uninsured male patient with moderate HTN, 120 (92%) of the 131 respondents stated that they would prescribe a diuretic or β-blocker as their preferred drug, concordant with JNC V guidelines.[14,15] When presented with a list of antihypertensive drug samples (Table 1), 35 (27%) of the 131 respondents indicated that they would dispense a drug sample. Thirty-two (91%) of the 35 self-reported sample users selected samples that differed from their preferred initial therapy. Self-reported sample users indicated they would dispense the following drug samples: an angiotensin-converting enzyme inhibitor (60%); a calcium channel blocker (37%); and an angiotensin II inhibitor (3%). "To avoid burden of cost to the patient" was cited by 97% of self-reported sample users as an important or extremely important reason for their decision (Fig. 1).

When self-reported antihypertensive sample users were presented with a follow-up scenario in which the same patient returned with well-controlled HTN on the drug sample but now had health insurance that covered prescription costs in full, 24 (69%) of 35 self-reported sample users said they would write a prescription for the sampled medication rather than switch therapy. Twenty-one (88%) of the 24 self-reported sample users who reported that they would write a prescription for the originally sampled medication, would have written a prescription for a drug that differed from their preferred drug choice.

Scenario 3: Patient with Depression

Preferred initial therapy for an uninsured, 45-year-old woman with new onset depression was a tricyclic antidepressant for 41 respondents (31%) and selective serotonin reuptake inhibitor for 90 (69%) of respondents. One hundred eight (82%) of respondents reported that they would dispense a drug sample. While 55 (51%) of self-reported sample users had their preferred drug available as a sample, 53 (49%) indicated that they would dispense a sample that differed from their preferred drug choice. Again, "to avoid burden of cost to the patient" was cited by over 90% of self-reported sample users as an important or extremely important reason for dispensing a drug sample (Fig. 1).

Comparison of Self-Reported Sample Users and Nonsample Users

In each of the 3 scenarios, sample users tended to be younger than nonsample users. Resident status, specialty in internal medicine, female sex, and availability of drug samples at physicians' continuity sites were associated with drug sample use. Statistically significant differences were detected among sample users and nonsample users in the UTI and depression scenarios (Table 3).

To further clarify differences between drug sample users and nonusers, we compared physicians who used samples in 2 or 3 of the scenarios (frequent sample users) to those who used samples in no or one scenario (infrequent sample users). Residents ($P = .03$) and younger physicians ($P < .0001$) were more likely to say that they would dispense a sample for 2 or more of the scenarios. In stepwise logistic regression, only physician age was independently associated with use of drug samples in 2 or more scenarios (OR = 0.35; 95% confidence interval, 0.18 to 0.67 for a 10-year increase in age).

Attitude Toward Drug Sample Use

Eighty-six percent of respondents agreed that drug samples are a source of medications for those patients who cannot afford them. However, a similar proportion indicated agreement with the statement that the use of drug samples deprives patients of pharmacist screening for drug interactions and counseling on appropriate use and side effects (Fig. 2). When attitudes were compared between frequent sample users (2 or 3 of the scenarios) and infrequent sample users (0 or 1 scenario), a higher proportion of more frequent sample users (92% vs 55%) agreed that drug samples are a source of medications for patients who cannot afford them ($P < .0001$). A lower proportion of frequent sample users (37% vs 70%) agreed that drug samples contribute to the high cost of care ($P = .0006$).

DISCUSSION

In this study of self-reported physician behavior, avoiding cost to the patient was the most consistent motivator for physicians to use drug samples, although physicians acknowledged other benefits of drug samples that varied with the clinical scenarios. The perceived benefits of drug samples often led physicians to report that they would dispense or prescribe drugs that differed from their preferred drug choice. Residents and internists were more

Table 3. Comparison of Self-Reported Sample Users and Nonsample Users

	Urinary Tract Infection			Hypertension			Depression		
	Sample Users *n* (%)	Nonsample Users *n* (%)	*P* Value	Sample Users *n* (%)	Nonsample Users *n* (%)	*P* Value	Sample Users *n* (%)	Nonsample Users *n* (%)	*P* Value
Total	22 (100)	109 (100)		35 (100)	96 (100)		108 (100)	23 (100)	
Mean age, y ± SD	30 ± 2.7	36 ± 8.7		33 ± 6.9	35 ± 8.8		34 ± 7.0	43 ± 12.4	
Gender			.54			.38			.02
Male	8 (36)	52 (48)		13 (37)	47 (49)		46 (43)	14 (61)	
Female	14 (64)	57 (52)		22 (63)	49 (51)		62 (57)	9 (39)	
Specialty			.01			.68			.13
Internal medicine	22 (100)	74 (68)		27 (77)	68 (71)		82 (76)	13 (57)	
Family medicine	0 (0)	35 (32)		8 (23)	28 (29)		26 (24)	10 (43)	
Level of training			.02			.20			.03
Resident	18 (82)	60 (55)		24 (69)	54 (56)		69 (64)	9 (39)	
Attending	4 (18)	49 (45)		11 (31)	42 (44)		39 (36)	14 (61)	
Access to samples in clinic			.35			.51			.02
Yes	11 (50)	42 (39)		16 (46)	37 (39)		49 (45)	4 (17)	
No	11 (50)	67 (61)		19 (54)	59 (61)		59 (55)	19 (83)	
Dispensed sample different from preferred drug	21 (95)			32 (91)			53 (49)		

likely to report using drug sample than attendings and family physicians.

Physicians' self-reported drug sample use appears to be driven by the best intentions of providing high-quality care to patients. In the treatment of a lower, uncomplicated UTI, drug samples served as a source of immediate drug therapy, allowing physicians to initiate treatment promptly to relieve the patient's symptoms and prevent potential complications. In comparison, for the management of depression in which responses and side effects to drug therapy vary, drug samples were used on a trial basis to assess individual effectiveness and side effects.

Physicians' self-reported drug sample dispensing suggests that the availability of drug samples may alter their prescribing practices, with potential implications for patient care and health care costs. The most disturbing finding is that the presence of drug samples may influence physicians to dispense or prescribe drugs that differ from their preferred drug choice. As a result, it is possible that compliance with evidence-based guidelines may be decreased. For example, all surveyed clinic sites had adopted the JNC V guidelines, which are based on scientific evidence related to long-term efficacy and cost for the treatment of HTN.[14,15] The preferred drug in the HTN scenario for almost all respondents was a β-blocker or diuretic, consistent with JNC V recommendations. But when drug samples were made available, 27% of physicians indicated that they would dispense a drug sample not recommended as a first-line agent by JNC V.[14,15]

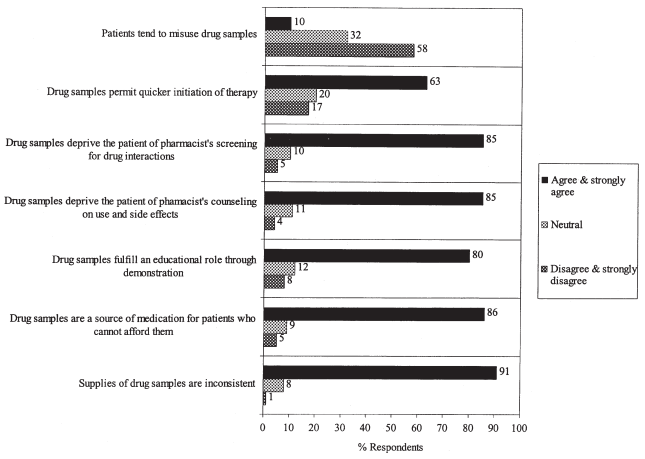

FIGURE 2. Physicians' attitudes toward the clinical use of drug samples ($N = 131$).

It is particularly noteworthy that in reducing the burden of drug costs on an individual patient, physicians may actually increase the overall cost of prescription medications. This is apparent in the HTN scenario, where a significant proportion of self-reported sample users subsequently would write a prescription for the more expensive sampled medication (which also differed from their preferred drug choice). Therefore, despite short-term cost savings to the patient, overall societal costs could increase when the sampled drug was subsequently prescribed although patients would not necessarily incur the additional costs. In addition, given the higher rate of sample use by residents, drug sample availability may influence resident behavior potentially leading to increased costs and suboptimal prescribing patterns over the long run.

Several features of this study may limit the generalizability of our findings. The study was conducted in an academic center, and we presented only a few case scenarios with limited treatment choices. Therefore, our results

may not be generalizable to other clinical settings or other disease processes. In using a scenario-based questionnaire, we were limited in our ability to simulate actual clinic visits and patient-provider relationships and have no direct confirmation of reported behavioral changes associated with drug samples. Previous research has documented variability in the extent to which written case simulations reflect actual clinical practice.[17,18] Response and social desirability biases may have inflated rates of compliance with guidelines and underestimated use of nonpreferred drugs.

This is the first study to our knowledge that addresses when and why physicians use drug samples, and under what circumstances physicians will subsequently prescribe a medication that was initially dispensed as a drug sample. By targeting a physician population based at one institution that has a formulary and clinical guidelines in common, we were able to minimize potential variability related to institutional policy. The anonymity of the survey encouraged accurate reporting of behavior and our high response rate minimized nonresponse bias. Given the lack of available data in this area, we hope this use of clinical vignettes will provide the impetus and guidance for future research that can assess actual practice patterns in diverse clinical settings.

Professional groups may want to develop guidelines similar to the Society of Teachers of Family Medicine guidelines[10] with protocols encouraging the appropriate use of drug samples. In addition, techniques such as academic detailing of unbiased drug information by health care professionals may be an effective means to promote the selection of drugs based on efficacy and cost.[19] Most importantly, because prescribing habits develop during training, increased attention and educational efforts should be directed at minimizing the effects of drug sample availability on residents' prescribing practices. Residents should be educated about the clinical use of drug samples and teaching clinics should consider alternative means of providing medications to patients who cannot afford to buy them. It is incumbent upon the medical profession to ensure that drug sample availability does not lead to overutilization of expensive medications when effective and inexpensive alternatives are available.

Local and national policy changes could counteract potential adverse effects of drug sample availability on physicians' practice patterns. Some health care organizations and training programs may want to consider developing alternatives to drug samples. One option is the availability of prepacks of first-line medications in clinics allowing physicians to initiate therapy immediately and save patients a trip to the pharmacy without changing physicians' drug choices to expensive second-line medications. Alternatively, the development of patient-assistance programs to provide indigent patients with medications at lower or no cost could lessen the burden of drug costs to those patients without the use of drug samples. If drug samples are used for patient care, we must ensure that they are used appropriately and without adversely affecting subsequent prescribing behavior or inflating long-term costs.

The authors would like to thank Kimberly La for her statistical evaluation.

REFERENCES

1. Avorn J, Chen M, Hartley R. Scientific versus commercial sources of influence on the prescribing behavior of physicians. Am J Med. 1982;73:4–8.
2. 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; 271:684–9.
3. 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;102:270–3.
4. Zuber A. Drug companies aim their sale pitch at physicians. Ask your doctor. New York Times, August 5, 1997; Sect C:1.
5. Weary PE. Free drug samples: use and abuse. Arch Dermatol. 1988;124:135–7.
6. Storrs FJ. Drug samples. A conflict of interest? Arch Dermatol. 1988;124:1283–5.
7. Debrovner D. Swamped by a sea of samples. American Druggist. October 1994: 29–32.
8. Erikson SH, Cullison S. Closing the sample closet. Fam Pract Manag. October 1995: 43–7.
9. Westfall JM, McCabe J, Nicholas RA. Personal use of drug samples by physicians and office staff. JAMA. 1997;278:141–3.
10. STFM Group on Pharmaceutical Industry in Family Medicine. Guidelines for residency program relationships with pharmaceutical and other proprietary companies. Kansas, Mo: Society of Teachers of Family Medicine; 1994.
11. Joint Commission on the Accreditation of Health Care Organizations. Policies and procedures support safe medication prescription or ordering. (Section Tx 3.3) In: Comprehensive Accreditation Manual for Hospitals: The Official Handbook. Oakbrook Terrace, IL: Joint Commission on Accreditation of Healthcare Organizations; 1996:158–9.
12. Morelli D, Koenigsberg MR. Sample medication dispensing in a residency practice. J Fam Pract. 1992;34:42–8.
13. Shaughnessy AF, Bucci KK. Drug samples and family practice residents. Ann Pharmacother. 1997;31:1296–300.
14. Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. The Fifth Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC V). Arch Intern Med. 1993;153:154–83.
15. University of Washington Physicians Subcommittee on the Quality Assessment and Improvement Working Group on High Blood Pressure Guidelines: University of Washington Physicians High Blood Pressure Guidelines. Seattle, Wash: University of Washington; 1996.
16. University of Washington Physicians Subcommittee on the Quality Assessment and Improvement Working Group on Major Depressive Disorder Guidelines: University of Washington Physicians Depression Guidelines. Seattle, Wash: University of Washington; 1996.
17. Jones TV, Gerrity MS, Earp J. Written case simulations: do they predict physicians' behavior. J Clin Epidemiol. 1990;43:805–15.
18. Sandvik H. Criterion validity of responses to patient vignettes: an analysis based on management of female urinary incontinence. Fam Med. 1995;27:388–92.
19. Soumerai SB, Avorn J. Principles of educational outreach ('academic detailing') to improve clinical decision making. JAMA. 1990; 263:549–56.