Direct-to-Consumer Prescription Drug Advertising and the Public

Robert A. Bell, PhD, Richard L. Kravitz, MD, MSPH, Michael S. Wilkes, MD, PhD

OBJECTIVE: Drug manufacturers are intensely promoting their products directly to consumers, but the impact has not been widely studied. Consumers' awareness and understanding of, attitudes toward, and susceptibility to direct-to-consumer (DTC) drug advertising were examined.

DESIGN: Random-digit dialing telephone survey with a random household member selection procedure (completion and response rates, 58% and 69%, respectively).

SETTING: Respondents were interviewed while they were at their residences.

PARTICIPANTS: Complete data were obtained from 329 adults in Sacramento County, California.

MEASUREMENTS AND MAIN RESULTS: Outcome measures included awareness of advertisements for 10 selected drugs, misconceptions about DTC advertising, attitudes toward DTC ads, and behavioral responses to such promotions. The influence of demographic characteristics, health status, attitudes, beliefs, and media exposure on awareness and behaviors was examined. On average, respondents were aware of advertisements for 3.7 of the 10 drugs; awareness varied from 8% for Buspar (buspirone) to 72% for Claritin (loratadine). Awareness was associated with prescription drug use, media exposure, positive attitudes toward DTC advertising, poorer health, and insurance status. Substantial misconceptions were revealed; e.g., 43% thought that only "completely safe" drugs could be advertised. Direct-to-consumer advertisements had led one third of respondents to ask their physicians for drug information and one fifth to request a prescription.

CONCLUSIONS: Direct-to-consumer advertisements are reaching the public, but selectively so, and affecting their behaviors. Implications for public policy are examined.

KEY WORDS: prescription drugs; advertising; drug safety; drug promotion; drug regulation.

J GEN INTERN MED 1999;14:651-657.

One of the triumphs of the biomedical revolution of the past 30 years is the development of a large and growing pharmacopoeia of prescription drugs. Used appropriately, these drugs enhance patients' quality of life, improve

functional capacity, and sometimes extend life. However, in the aggregate, prescription drugs represent a substantial health care expenditure.¹ To ensure steady demand for their products, pharmaceutical manufacturers have traditionally deployed large armies of sales representatives marketing their wares to physicians. In recent years, managed care has altered the role of physicians as drug-purchasing agents. To control drug costs, managed care organizations and capitated physician groups have established drug formularies, utilization review systems, and pharmaceutical risk-sharing agreements^{2,3} (also see Wall Street Journal. May 22, 1997: A1, A11). As a result, the pharmaceutical industry has altered its marketing strategy by increasing its reliance on direct-to-consumer (DTC) advertising. Expenditures for DTC drug advertisements were \$600 million in 1996 and by 2005 are projected to grow to as much as \$7.5 billion⁴ (also see Wall Street Journal. July 1, 1997: B1, B6; and San Francisco Chronicle. March 12, 1998; E1, E12).

In light of these trends, it is important to understand the impact of DTC advertising on its target audience. A survey was developed to address four fundamental issues surrounding DTC advertising. First, is the public paying attention to these promotions? If these messages receive little attention, then oft-voiced concerns about their accuracy and effects can be allayed.⁵ Ad awareness was expected to be higher among individuals who had greater media exposure,⁶ rated their health more poorly, had been diagnosed with medical conditions addressed in current advertisements, were covered by a health plan that could help to pay for these drugs, and were more educated and thus better equipped to process such information.⁷ Second, we predicted that consumers would be more likely to attend to and be influenced by these promotions if they falsely assume that DTC advertisements are subjected to extensive regulatory preapproval.⁸ Third, we examined people's approval of DTC advertising. Finally, we studied how people respond to such advertising. Are they reading these advertisements and consulting their physicians about advertised drugs? We expected to find greater influence among those respondents who were more aware of these advertisements, had more faith in their regulation, were regular users of prescription drugs,⁶ and held positive attitudes toward DTC advertising.

METHODS

Sampling Procedure

Our sample, drawn from Sacramento County, was generated using a telephone survey strategy based on

Received from the Department of Communication, University of California, Davis, Davis, Calif. (RAB); Division of General Internal Medicine and Director, Center for Health Services Research in Primary Care, University of California, Davis, Sacramento, Calif (RLK); and Department of Medicine, School of Medicine, University of California, Los Angeles, Los Angeles, Calif (MSW)

Address correspondence and reprint requests to Dr. Bell: Department of Communication, University of California, Davis, CA 95616.

random digit dialing of computer-generated numbers.⁹ During the spring of 1998, five trained assistants completed a total of 329 interviews. The supervisor made random callbacks to validate calls. No attempt was made to conduct an interview when calls were to nonresidential quarters or to households in which only a foreign language was spoken. The Hagen-Collier respondent selection procedure was used to select randomly a member from each household for inclusion in the study.¹⁰ The targeted individual from each household was considered unreachable after six unsuccessful calls. The response rate was 69% for households for which contact with the eligible party was made (completions/all eligibles was 58%).

Questionnaire

The survey typically took 8 to 10 minutes to complete. The questionnaire, which was pretested prior to final use and is available from the authors, was organized around the six sections outlined below. Of necessity, our measures were kept brief to maintain a reasonable interview length.

Ad Awareness. Respondents indicated whether or not they had seen an advertisement for each of 10 drugs that were being advertised at the time of the survey: Accolate (zafirlukast); Buspar (buspirone); Claritin (loratadine); Fosamax (alendronate); Glucophage (metformin); Imitrex (sumatriptan); Pravachol (pravastatin); Prilosec (omeprazole); Prozac (fluoxetine); and Sporanox (itraconazole). Response categories were *no, have not seen advertisement; yes, have seen advertisement; and unsure*. These drugs were selected from among the drugs being advertised to represent a wide range of medical conditions. In addition, one bogus drug, "Influgone," an alleged treatment for influenza, was included as a check on respondent deception. Interviewers stressed that they were asking if respondents had seen an advertisement for each drug—not if they had heard of the drug itself. An Ad Awareness Index was created by summing for each respondent the number of drugs for which she or he reported having seen an advertisement.

Faith in Regulation. Four true/false statements about government oversight and regulation of DTC advertisements were included to assess respondents' confidence in consumer protections: "Drug companies must submit copies of all prescription drug ads to the federal government for approval before those ads are used," "Only prescription drugs that have been found to be completely safe can be advertised in the United States," "Only prescription drugs that have been found to be extremely effective can be advertised in the United States," and "The advertising of prescription drugs that have serious side effects has already been banned in the United States." The correct answer to all four statements is "false." A Faith in Regulation Scale was computed by counting across the four belief statements the number judged (incorrectly) by the respondent

to be true. This measure thus had a range of 0 (no misconceptions) to 4 (most uninformed about DTC advertising regulation); its α reliability¹¹ was .53.

Attitude Toward Direct-to-Consumer Advertising. Four items were included to gauge each respondent's attitude toward DTC advertising: "Prescription drug ads provide consumers with valuable information about medical treatments," "Most prescription drug ads are careful to describe both the risks and the benefits of these drugs," "Most prescription drug ads are deceptive," and "I disapprove of prescription drug advertising." Response categories were *strongly agree, agree, unsure, disagree, and strongly disagree*. A confirmatory factor analysis showed these items to constitute a unidimensional measure; an attitude score was thus computed by averaging across the items, after reverse-scoring the two positively worded statements. This scale had a range of 1 (most negative attitude) to 5 (most positive) and an α reliability of .74. Although a reliability of .80 is generally considered acceptable, smaller values are reasonable for short instruments and instruments composed of dichotomous measures.¹²

Past Influence. Five questions assessed past behavioral responses to DTC advertisements. Respondents indicated if they had ever, as a result of seeing such an advertisement, done the following: (a) asked their doctor for a prescription; (b) asked their doctor for more information about the advertised drug; (c) carefully read, from beginning to end, a DTC advertisement; (d) clipped a DTC advertisement for later reference; and (e) called a toll-free number given in an advertisement to obtain additional information. A factor analysis revealed that the first four of these five items comprised a unidimensional scale. A Past Influence Index was created by counting the number of affirmative responses to the items labeled as a through d above, creating a measure with a range of 0 to 4, with higher scores indicating more past influence ($\alpha = .63$).

Health Care Access, Health Status, and Medical Conditions. Respondents indicated if they were covered by a health care plan at the time of the survey and, if insured, how often they thought their plan would help to pay for their prescriptions. A question was also included to assess continuity of care, with continuity assumed to be present for the respondent who received most care from the same doctor or doctors. Each respondent was asked if she or he had ever been diagnosed with the medical conditions for which the 10 drugs included in the awareness section were advertised as treatments: asthma (Accolate); anxiety, "nerves," or panic attacks (Buspar); seasonal allergies (Claritin); osteoporosis (Fosamax, asked of female respondents only); diabetes (Glucophage); migraine headaches (Imitrex); high cholesterol level (Pravachol); severe heartburn (Prilosec); depression lasting at least 2 weeks (Prozac); and toenail fungus (Sporanox). Also administered was the 5-item General Health Perceptions subscale of the 36-Item Short Form (SF-36), which was scored based on the

procedure outlined by Ware¹³; higher scores indicated better self-evaluated health (range, 5–25; $\alpha = .83$). Finally, respondents reported if they were using any prescription drugs at the time of the interview (0 = no, 1 = yes).

Demographic Questions and Media Exposure. Standard demographic information was obtained at the conclusion of each interview. In addition, respondents estimated the number of hours of television they watched in the average day and the number of different magazine titles they read in the typical month. The focus on magazine use reflects the wider diversity of DTC advertising that appears in magazines rather than in newspapers.

Statistical Analyses

Analyses were carried out as follows. First, several variable sets were recoded. Respondents' reports of awareness for each drug were recoded into two categories: *unaware/unsure* (0) and *aware* (1). Because of the skewed nature of the media exposure estimates, "low" and "high" magazine readership and television viewing groups were created based on a median split for each set of reports. Race was recoded as a dichotomous variable (0 = minority, 1 = white) because there were too few cases to allow for meaningful comparisons among minority groups. Second, the dimensionality of the multiple-item instruments—Attitude Scale, Faith in Regulation Index, and Past Influence Index—was examined via confirmatory factor analyses, based on the EQS procedure.¹⁴ Third, associations between categorical variables were examined using cross-tabulations. Fourth, correlational procedures were employed to examine the relations of the various predictor variables with outcomes. The variables included in these analyses were measures of health care access (continuity of care, insurance status, and insurance coverage of prescription drugs); medical conditions and health status (past diagnosis of the 10 specific conditions targeted in the 10 reference advertisements, General Health Perceptions subscale, and prescription drug use at the time of the interview); advertising awareness (the Ad Awareness Index); attitudes and beliefs (Attitude Scale and Faith in Regulation Index), media exposure (magazine reading and television viewing), and demographic characteristics (age, sex, education, income, and race). Fifth, logistic regression procedures were used to examine the relation between the predictor variables and advertising awareness for each of the 10 drugs.

RESULTS

Sample Characteristics

Data were collected from 201 women and 128 men ($n = 329$). The greater proportion of women in the sample (61%) reflects both a higher refusal rate among men and more difficulty in reaching male targets (54% of adults in the survey population are women). Approximately 77% of

the sample was white, compared with a population value of 75%. The age profile of the sample was as follows: 18–29 years (21%), 30–39 years (18%), 40–49 years (22%), 50–59 years (16%), 60–69 years (11%), 70 years and older (12%), declined to answer (<1%). Seniors were slightly overrepresented in the sample, owing perhaps to their greater accessibility. About 19% of respondents reported household incomes under \$30,000; 25% were in the \$30,000 to \$44,999 range; 29% were in the confines of \$45,000 to \$59,999; 26% had household incomes of \$60,000 or higher; and slightly more than 1% declined to answer the income question (comparable income data were not available for the population as a whole). Approximately 58% of respondents had a high school diploma or less and 42% were college graduates; census data reveal that 23% of the survey population held college degrees. At the time of the survey, 58% of respondents were taking at least one prescription drug, 93% were covered by a health plan, and 84% received their health care from the same doctor or team of doctors.

Are Consumers Aware of DTC Advertising?

Ad awareness data for the 10 drugs (Table 1) suggest that DTC promotions receive substantial attention, although there was great variation in awareness for the drug advertising campaigns examined. Recognition varied from 8% for Buspar to 72% for Claritin. There did not appear to be any widespread tendency to exaggerate knowledge on the part of these respondents, as only 3% reported having seen an advertisement for the bogus drug "Influgone." On average, respondents reported being aware of advertising for 3.72 (2.23, SD) of the 10 drugs. Women reported having seen advertisements for 4 of the 10 drugs, compared with 3.31 drugs for men ($p < .006$). Significant sex differences ($p < .05$ criterion) favoring women were found for Claritin (79% vs 63%), Fosamax (28% vs 16%), and Imitrex (40% vs 20%); for no drug were men significantly more aware of advertising than were women. The sex difference on the Ad Awareness Index remained significant even when removing the female-oriented drug Fosamax (osteoporosis) from the Index, and even after controlling for demographic variables, health perceptions, health care access, and media exposure.

Table 1 compares ad awareness rates of individuals affected by the health conditions examined with rates of respondents without the conditions. For instance, 70.5% of asthmatic subjects reported being aware of an advertisement for the asthma drug Accolate, compared with only 41.5% of nonasthmatic subjects. Significantly greater awareness among diagnosed individuals was found for 8 of the 10 drugs; these differences were usually substantial in magnitude.

The Ad Awareness Index was significantly, though modestly, correlated with 7 of the 12 predictors. Individuals most aware of DTC advertisements tended to be taking prescription drugs at the time of the survey (point biserial

Table 1. Ad Awareness Rates, Disease Diagnosis Rates, and Ad Awareness Stratified by Diagnosis

Drug/Disease	Marginal Percentages*		Ad-Aware Percentages†		p
	Ad-Aware	Diagnosed	Diagnosed	Not Diagnosed	
Accolate/asthma	45.2	13.3	70.5	41.5	.002
Buspar/anxiety	8.2	11.5	31.6	5.2	.001
Claritin/allergic rhinitis	72.4	36.1	78.8	69.4	NS‡
Fosamax/osteoporosis§	23.6	6.5	61.5	26.2	.02
Glucophage/diabetes	15.2	4.2	35.7	14.3	NS
Imitrex/migraines	31.8	12.1	55.0	28.8	.002
Pravachol/hypercholesterolemia	48.5	21.2	70.0	42.6	.001
Prilosec/heartburn, ulcers	29.7	9.1	63.3	26.2	.001
Prozac/depression	69.1	13.9	84.8	66.7	.02
Sporanox/toenail fungus	28.5	9.7	53.1	26.0	.003

*The marginal percentages reported reflect the percentage of all respondents who were aware of ads for each drug and the percentage of all respondents who have been diagnosed with the relevant condition.

†The probabilities for the observed differences in awareness rates between individuals reporting the presence of the drug's indicated medical condition and those reporting no such condition are based on the χ^2 test (continuity correction), with 1 df.

‡NS indicates not significant.

§Percentage of respondents aware of Fosamax advertising reflects data of both men and women. The percentage of respondents diagnosed with osteoporosis is based on data from female respondents only. Likewise, only women have been included in the comparison of awareness rates for diagnosed and undiagnosed respondents for this disease/drug combination.

$r = .24$, $p < .001$), had greater exposure to magazines (point biserial $r = .24$, $p < .001$), were more frequent viewers of television (point biserial $r = .24$, $p < .001$), had a more positive attitude toward DTC advertising ($r = .20$, $p < .001$), were more likely to be female (point biserial $r = -.15$, $p = .006$), evaluated their general health less positively ($r = -.12$, $p = .04$), and believed that their health plan would cover drug costs (point biserial $r = .11$, $p = .03$).

Ten separate stepwise logistic regression analyses were carried out, one for each drug, to profile the multivariate predictors of individual ad awareness.¹⁵ Awareness was treated as a dichotomous dependent variable (0 = unaware/unsure, 1 = aware). The dichotomous independent variables in the analyses included diagnosis of the ailment for which the drug was advertised, current prescription drug use, magazine reading, television viewing, insurance status, continuity of care, race, education, and sex. Also included were the variables attitude toward DTC advertising, faith in regulation, age, and income. Table 2 summarizes the odds ratios (and 95% confidence intervals) for the analyses. For the sake of clarity and brevity, we have excluded from Table 2 those independent variables that failed to emerge as a significant predictor in any of the analyses.

Of most interest are patterns of significant associations that cut across the 10 brand-name drugs examined. The most frequent multivariate predictor of ad awareness for these drugs was a diagnosis of the condition for which the drugs were promoted as treatments (7 of 10 brands); in contrast, general health perceptions failed to enter into any of the equations, suggesting that awareness is motivated more by specific medical concerns than by general health worries. Magazine exposure was the second most consistent predictor of awareness (6 of 10 brands)—and a more consistent predictor than television viewing (3 of 10

brands), which may reflect the industry's greater current reliance on print advertising. One of the three brands predicted by television viewing, Prozac, has not, to our knowledge, been advertised on television; however, its print advertising was receiving television news attention at the time of the survey. Attitudes were associated significantly with awareness for four drugs; with the exception of Prozac, more positive attitudes were associated with greater ad awareness. People using prescription drugs at the time of the survey were more aware of advertising campaigns for two of the drugs. Continuity of care was predictive of awareness of advertisements only for the osteoporosis treatment Fosamax. Insurance status was not associated with ad awareness for any drugs, but the low proportion of uninsured individuals in this sample did not provide much statistical power for this predictor. Faith in regulation failed to enter into the equations because of the stronger, overlapping influence of attitudes.

Demographic characteristics were not often related to awareness, but significant relations were sometimes obtained. For instance, women were more likely to be aware of advertisements for treatments for seasonal allergies, osteoporosis, and migraine headaches; and older respondents were more aware of advertisements for osteoporosis and hypercholesterolemia. Education was associated positively with awareness of Buspar, but negatively with awareness of Accolate.

Do Consumers Understand the Nature of Drug Advertising?

Many respondents harbored incorrect beliefs about the regulation of DTC advertising. Approximately 50% thought that DTC advertisements had to be submitted to the government for prior approval, 43% thought that only

Table 2. Estimated Odds Ratios (and 95% Confidence Intervals) for Significant Predictors of Ad Awareness for 10 Brand-name Prescription Drugs

Predictor	Accolate	Buspar	Claritin	Fosamax	Glucophage	Imitrex	Pravachol	Prilosec	Prozac	Sporanox
Medical/health status										
Diagnosed w/target condition (0 = N, 1 = Y)	3.26* (1.58, 6.71)	10.81† (3.90, 30.02)				2.75* (1.35, 5.56)	2.36* (1.28, 4.38)	4.48* (1.97, 10.05)	3.26* (1.35, 7.88)	3.44* (1.61, 7.32)
Currently using a Rx drug (0 = N, 1 = Y)		5.32* (1.58, 17.90)	3.41* (1.80, 6.47)							
Continuity of care (0 = N, 1 = Y)				3.15† (1.26, 7.89)						
Attitude toward DTC ads, quartile										
1st (most neg.)	1.0	1.0	1.0						1.0	
2nd	1.43 (0.72, 2.82)	0.50 (0.10, 2.57)	0.91 (0.44, 1.88)						3.22* (1.53, 6.77)	
3rd	1.72 (0.90, 3.29)	.72 (0.18, 2.93)	0.84 (0.42, 1.68)						1.11 (0.58, 2.12)	
4th (most pos.)	2.67* (1.37, 5.20)	3.15† (0.99, 9.96)	3.55* (1.44, 8.80)						2.86* (1.38, 5.93)	
Media exposure										
Magazine reading (0 = low, 1 = high)			1.98† (1.16, 3.39)		2.50* (1.29, 4.84)	2.59* (1.55, 4.31)	1.95* (1.23, 3.11)	1.76† (1.05, 2.94)		2.06* (1.23, 3.43)
Television viewing (0 = low, 1 = high)	2.20* (1.38, 3.51)							2.50* (1.51, 4.13)	2.90† (1.70, 4.97)	
Demographics										
Sex (0 = F, 1 = M)			0.51† (0.29, 0.89)	0.47† (0.26, 0.84)		0.37* (0.21, 0.63)				
Race (0 = minority, 1 = white)		0.13† (0.05, 0.38)								0.55† (0.32, 0.96)
Age, years										
18-39			1.0	1.0			1.0			
40-59			0.56 (0.29, 1.08)	1.46 (0.76, 2.81)			1.66 (0.97, 2.82)			
60 and older			0.32* (0.15, 0.71)	3.77† (1.92, 7.42)			3.13* (1.64, 5.95)			
Highest degree										
High school or less	1.0	1.0								
College degree	0.61† (0.38, 0.99)	2.66† (1.04, 6.78)								

* $p < .01$.† $p < .001$.‡ $p < .05$.

“completely safe” prescription drugs could be advertised directly to the consumer, 21% believed that only “extremely effective” drugs could be so marketed, and 22% believed that the advertising of prescription drugs with serious side effects had already been banned. The Faith in Regulation Index correlated positively with the Attitudes Toward DTC Advertising Scale ($r = .38$, $p < .001$), suggesting that those holding positive opinions about such advertisements may be uninformed in their assumptions about regulatory controls. In addition, minorities were significantly more misinformed about the regulation of DTC advertising than were white respondents (means, 1.80 vs 1.22, $p < .001$).

How Do Consumers Feel About Drug Advertising?

The mean on the Attitude Toward DTC Advertising measure was 3.15 (0.82, SD) on the underlying 5-point scale, indicating a neutral sentiment for the sample as a whole. Approximately 13% of respondents had scores less than 2.0, which can reasonably be considered a disapproving attitude; 24% had scores greater than 4.0, an ap-

proving view. Attitude, in addition to being associated with undue faith in DTC advertising regulation as noted above, was correlated positively with the Ad Awareness Index ($r = .20$, $p < .001$).

Do Drug Advertisements Affect Consumers' Behaviors?

Approximately 19% of respondents reported having asked for a prescription as a result of a DTC advertisement, while 35% claimed to have asked a physician for more information because of an advertisement. A total of 56% reported having read a DTC advertisement carefully, “from beginning to end,” and 17% had clipped a DTC promotion for later reference. Only 9% reported ever calling a toll-free number presented in a DTC advertisement. Thus, DTC advertisements have led some of these respondents to request prescriptions, but the most frequent effect has been to induce individuals to use their physicians as sources of information.

We also examined variations in behavioral responses to DTC advertisements. People who had been influenced

by DTC advertisements in the past were more likely to be aware of current advertising appeals ($r = .39, p < .001$), to have a positive attitude toward DTC advertising ($r = .26, p < .001$), to evaluate their health less positively ($r = -.18, p < .001$), to have greater exposure to magazines (point biserial $r = .18, p < .001$), to overestimate the extent of FDA oversight of such advertisements ($r = .16, p = .004$), to belong to a health insurance plan (point biserial $r = .16, p = .004$), to believe their insurance provided good coverage of prescription drugs ($r = .13, p = .02$), to be taking prescription drugs at the time of their interview (point biserial $r = .13, p = .02$), and to be female (point biserial $r = -.12, p = .03$).

DISCUSSION

This survey begins to address fundamental questions about the public's awareness and understanding of, attitudes toward, and susceptibility to DTC advertising. Prescription drug advertisements have unquestionably penetrated the consciousness of the American consumer. On average, our respondents were aware of advertisements for nearly 4 of the 10 drugs about which we inquired, with awareness approximating 70% for two drugs. The awareness levels we found exceed those of the only previous study of this type, which was conducted during the infancy of DTC advertising.⁶ Like past research, our study found awareness to be higher among individuals who had more extensive exposure to print media^{6,16}; unlike past investigations, television viewing in our study was also predictive of ad awareness. This discrepancy probably reflects the recent relaxation in the FDA's guidelines, which precipitated the current barrage of television commercials.¹⁷ Surprisingly, education was not strongly related to awareness (or to any other outcome measure), suggesting that DTC advertisements, like promotions for most consumer products, are designed to be accessible to mass audiences. One contribution of this study is its revelation of how selective attention to DTC advertising tends to be. Individuals were considerably more likely to take note of advertisements that address their medical conditions, indicating that attention to DTC advertisements is driven by the basic principle of subjective utility; that is, we process information that is perceived to have personal value.¹⁸

Our second research question concerned consumers' beliefs about DTC advertising. Apparently, many individuals mistakenly believe that DTC advertisements undergo preliminary review by government regulators and that only "completely safe" and "extremely effective" drugs can be advertised. These false assumptions could increase susceptibility to DTC advertisements; the individuals who held these erroneous beliefs tended to be more aware of such advertisements and were somewhat more likely to act on them. There have been discussions about whether or not DTC advertisements are misunderstood.¹⁹ Although this is an important question, our results suggest

that the very nature of this form of promotion may be misconstrued by many consumers.

Third, we raised the question of how people feel about DTC advertising. It has been suggested that consumers feel positive about these advertisements.⁵ This study suggests that the typical consumer is decidedly neutral, although there is much variation across individuals in their feelings about these advertisements. Importantly, those individuals who said they like DTC advertisements tended to have falsely confident views about the extent to which these appeals are regulated, suggesting that the positive attitudes held by some consumers may not be fully informed.

Finally, we asked if DTC advertisements are affecting people's behaviors. These advertisements do appear to be influencing many people, for one third of our respondents had talked with their doctors about an advertised drug and one fifth had asked for a prescription. Although other studies have asked individuals to speculate about how they might respond behaviorally to DTC advertisements,^{16,20} ours is the first investigation we know of that has attempted to describe the extent to which the public has actually been influenced.

This study is not without limitations. First, these findings reflect the experiences of only one county in California. Second, by relying on a telephone survey, our instruments were necessarily limited in length and breadth. The same constraint led us to choose a recognition-based measure of awareness in lieu of a measure of recall, a stronger approach to awareness assessment.²¹ Third, the cross-sectional nature of these data does not allow for unambiguous statements about cause and effect. Fourth, our methodology did not allow us to trace indirect or mediated effects of DTC advertising. A person could become aware of a new treatment through the exposure of a friend or relative to an advertisement for that drug or through news coverage of DTC promotional campaigns (for instance, the promotion of the impotence drug Viagra is a prominent news story at the time of this writing). Finally, we have not yet begun to examine the role of the "new media"—the Internet and World Wide Web in particular—as sources of information about prescription drugs.

Despite these limitations, this study has several implications for public policy and suggests opportunities for selective experimentation. Most significantly, the results evidence a compelling need to educate the public about the essential nature of DTC advertising, including its promotional purpose and limitations placed on its regulation. The development of a media literacy campaign that teaches about drug promotion strategies with cooperation on the part of the FDA, professional groups, and public health organizations merits consideration. Furthermore, the high level of advertising awareness documented here highlights the need to balance DTC advertisements with objective drug information.²² It may be that DTC advertisements are filling an important void for consumers, whose desire for medical information seems insatiable.

This is an area in which managed care organizations can improve their communication and education, with benefits to both consumers and providers.

Analyses of the veracity of advertising claims are also needed. The demonstrated ability of DTC advertisements to reach consumers and affect their behaviors raises concerns about the quality of information provided in these promotions. These messages come from an industry that has not always been above reproach in the claims it has made about its products.^{23,24} Health care professionals and the FDA need to monitor carefully and regularly DTC advertisements and be prepared to object when misleading claims are made. Proactive efforts to improve the educational value of DTC advertisements should also be considered. For example, media organizations could be encouraged to adopt guidelines that DTC advertisements must meet for acceptance; this tack has been suggested as a way to improve the quality of advertising for over-the-counter drugs.²⁵

The authors acknowledge the contributions of Michele Belluomini, Patrick Braun, Jesse Caid, Joslyn Ferrero, and Love Lord. This project was reviewed and approved by the University of California, Davis, Human Subjects Review Committee. Informed consent was obtained from all subjects.

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