

Determinants of Perceived Value of Direct to Consumer Advertising for Prescription Drugs: Do They Vary by Disease Condition?

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Abstract

Firms invest large amounts of money in direct to consumer (DTC) advertising for prescription drugs. However, under what conditions consumers perceive DTC advertising to be valuable? The results in this research show: 1) consumers with children who also seek advice from pharmacists perceive DTC advertising to be valuable; 2) educated consumers who have visited a doctor recently (in last 6 months) perceive DTC advertisements to be less valuable; and 3) disease condition of the consumer significantly impacts perceived value of DTC advertising.

Key Words: Direct to Consumer Advertising (DTCA), Perceived Value, Prescription Drugs, Disease Condition

1. Introduction

Direct-to-consumer (DTC) advertising total media spending for prescription products has rapidly increased since the Food and Drug Administration (FDA) lifted the ban in 1985, from \$10 million in 1989 to \$4.5 billion in 2014 (DTC Report 2015). On August 8, 1997, the Food and Drug Administration's Division of Drug Marketing, Advertising and Communications (DDMAC) reversed its long-standing position on DTC advertising and issued a less restrictive guidance for broadcast advertising of prescription products. The impact of the agency's actions was immediate and far-reaching. In 1997 pharmaceutical companies spent more than \$917 million on DTC advertising, a 46% increase from 1996 ([American Journal of Health-System Pharmacy](#) 1998).

In 2014 the DTC promotional expenditure was 4.5 billion dollars, a 21% increase over 2013 expenditures (Medical Marketing and Media 2015). Television at 69% of the total media spend in 2014 is the dominant media channel for pharmaceutical DTC advertising. (See Figure 1). The goals of DTC advertising are threefold: 1) to improve communication and patient knowledge yielding positive healthcare outcomes; 2) to create awareness about the diseases and thus increase new patient flow to physician offices (customer acquisition); and 3) to increase brand awareness and brand loyalty by increasing perceived value and patient compliance (customer retention)⁴. Pharmaceutical companies believe that motivating patients to ask for products through the use of DTC advertising will positively improve financial performance.

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⁴ However, we caution that compliance is a complicated phenomenon that is affected by several factors. For example, if harmful side effects emerge during the course of the medication no amount of advertising is likely to increase compliance. But the fact that a patient is involved in learning about their condition through DTC and actively participate in the decision making process for a prescription product choice can contribute to increased compliance provided the side effects were considered tolerable.

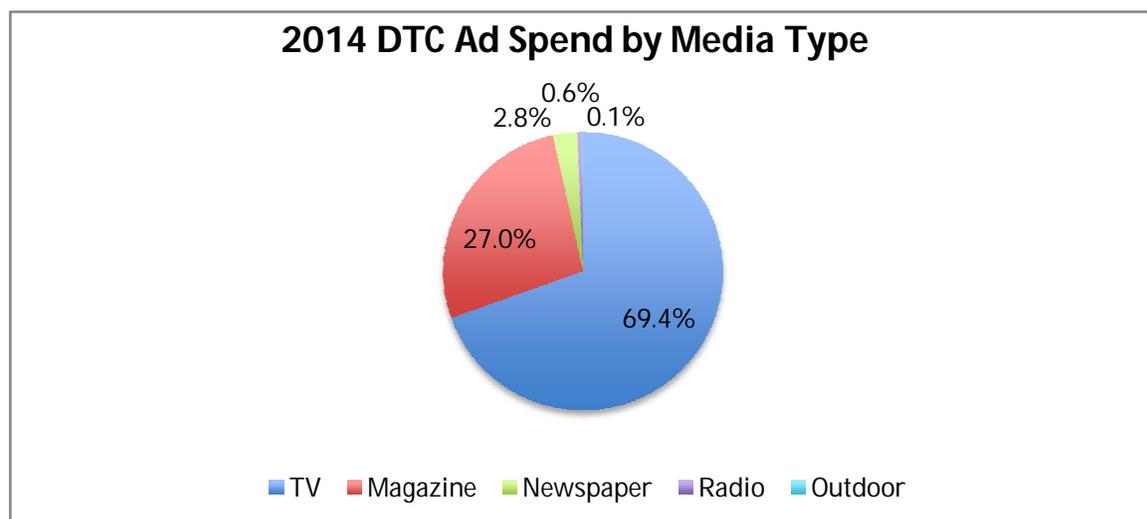
For example, Viagra® marketers advertise for 3 Free Pills and 30% off your first refill in their “ask your doctor” campaigns to motivate consumers to request prescriptions for the specific drug. If the physician agrees to write the prescription and if the coupon is redeemed, the pharmaceutical manufacturer gets valuable feedback on sales in addition to the traditional feedback obtained from the salesforce. For conditions like depression, pharmaceutical companies do DTC advertising to create awareness about the condition itself and to urge consumers to talk to their physicians. An estimated 16 million American adults—almost 7% of the population—had at least 1 major depressive episode in 2014.

This research studies the perceived value of DTC advertisements to consumers. We empirically investigate several research questions: What types of consumers have a positive perception of direct to consumer advertising? Do the factors that are related to the DTC advertisement vary by disease condition? For example some disease conditions are highly symptomatic, such as pain and allergies, and some are less symptomatic and hard to diagnose, such as depression and hypertension. With varying risk perception of these different disease conditions, consumers might have different levels of perceived value of DTC advertising. Our goal is to identify variation in the factors that determine the perceived value by disease condition. For a comprehensive analysis we utilized one nationwide survey conducted by IMS Health.

Proponents’ of DTCA assert that it raises awareness about diseases, educates consumers, improves patient-doctor communication and compliance, and thereby empowers the public’s health status. For example, Zolnierok, H., Kelly B.; DiMatteo, M. (2009) support that health benefit and price reductions would follow if advertising to consumers were increased. Additionally, they conclude that communication in medical care is highly correlated with better patient compliance. In contrast, opponents argue that DTCA tends to raise unrealistic expectations about the benefits of medication and thus increases consumer demand of medicine, thereby leading to an over-medicalized society (Myers et al., 2011; Suh et al., 2011). A stream of research discusses prescription drug advertising to consumers but does not mention whether patients are generally receptive to it. For example, Zaltman and Vertinsky (1971) present one of the earliest models of the impact of an informative message on promoting the health status of individuals. See also Alperstein and Peyrot (1993), Petroschius, Titus, and Hatch (1995), Roth (1996), Christensen, Ascione, and Bagozzi (1997), Parker and Delene (1998), and Schommer, Doucette, and Mehta (1998).

The contribution of our research is summarized as follows: We test whether pharmaceutical DTC advertising is valued by consumers, whether this valuation is influenced by demographic factors, and whether the factors vary by disease conditions. In the rest of the paper Section 2 presents the consumer data and results, and Section 3 concludes with a discussion of results, managerial implications, and future research.

Figure 1



Source: DTC Report, Medical Marketing and Media, April 2015

2. Hypotheses Regarding Consumers' Evaluation of Pharmaceutical Advertisements

2.1 *Consumers' Participation in the Prescription Decision*

In the prior literature Moorman and Matulich (1993) include health motivation and health ability as critical precursors of health information acquisition behavior and health maintenance behavior. Motivation is defined as goal-directed arousal (Park and Mittal 1985). In our context the goal is the processing of information in the advertisements, similar to the context used by MacInnis, Moorman, and Jaworski (1991). Moorman (1990) includes familiarity and enduring motivation as antecedents of motivation and ability to process a message containing health information.

If a consumer has been sick recently, has a disease condition, or seeks advice on medication then the person is likely to be relatively more motivated to process information related to health than the average person. A person who lives with a member of the medical profession may be more motivated about issues related to her/his health. Parents are more likely to be motivated and able to process health-related information than people without children, since they care for at least one more person's health besides their own. These variables that we use are similar to the average weekly consumption measure discussed in Park and Mittal (1985).

MacInnis, Moorman, and Jaworski (1991) present a survey of how prior researchers quantify health motivation, opportunity, and ability, and cite education among health ability measures. Similarly, Moorman and Matulich (1993) include education as a measure of health ability in their study. We expect that consumers who are relatively more motivated and able to process health-related information are more likely to take part in their health care decisions. Thus, such consumers are expected to have a positive view of advertising of prescription products than others. The independent variables we use to test this hypothesis are: having been sick recently, using a drug for a condition or disease, seeking frequent advice on prescription products from a physician, a pharmacist, a nurse, a friend or relative, living with a member of the medical profession, number of children, age, income and education level. Therefore, we propose the following.

H₁: Motivated consumers such as those with children who prefer to exercise control over their own health care decisions are more likely to perceive DTC advertisements more valuable than other consumers.

H₂: Consumers who trust their physicians' judgment more than their own are less likely to value DTC advertising than other consumers.

2.2 *Impact of Disease Condition*

In contrast to the above discussion depending on the disease condition that the consumers are familiar they may feel that the perceived value of DTC advertising might vary. For example, two factors, symptoms and duration of the disease, can be used to differentiate different disease conditions. For example, hypertension is a disease that does not show very clear debilitating symptoms and also one has to be on medication for a long period of time. On the other hand pain can show clear physical symptoms and can be short term. In addition, consumers might be more aware of pain medications than hypertension treatment. Finally, the level of perceived risk in treating the condition might vary too. They may instead choose to trust the physician and "let the physician decide" on the prescription. These consumers may perceive that the DTC advertising might be of less value than others.

Friedman and Churchill (1987) present an experimental study and depict physicians as a source of power in the physician-patient relationship. They identify three sources of power: expert-legitimate power, referent power (physician as a parent figure), and coercive power. Of course, their discussion predates the emergence of managed care organizations as another source of power. Managed care organizations encourage physicians to join the cost-containment effort through the use of drug formulary lists and disease management. More recent physician-patient relationship studies find that there is heterogeneity across physicians in their relationships with patients. Some physicians team up with the patient, as in "we will manage the disease together," while some others retain the role of the sole authority (Lagerlov, Leseth, and Matheson 1998). Another study explores patients' authority over physicians because they experience symptoms while physicians do not (Peters, Stanley, Rose, and Salmon 1998).

If a consumer seeks advice from a physician frequently then we can classify that person as someone who lets the physician take charge or has trust in the physician. That person is less likely to appreciate the directness of prescription advertising or perhaps read advertisements only when handed out by the physician. We expect that, similarly, a person living with a medical professional may be more likely to leave the prescription decision to professionals.

It is possible that as consumers age they may get more conservative, build more loyalty toward their physicians, and trust their physicians more. In contrast, younger consumers may be more eager to develop their own understanding of the health care system, be more open to new ideas and new prescriptions, and have less of a chance to have established relationships with physicians.

We propose that relatively more educated people are more likely to believe in specialization and training, and hence, are more likely to trust the judgment of a trained professional than their own evaluation of a prescription advertisement. Therefore, we make the following proposition.

H₃: The factors that determine the perceived value of DTC advertising by consumers vary by disease condition.

Consumers who trust their physician are less likely to need and value DTC advertising. The independent variables we use to test this hypothesis are: the pursuit of frequent advice from a physician on prescription products, living with a member of the medical profession, age, and education level. Note that according to **H₁** the effects of seeking advice from a physician, living with a medical professional and education are in the opposite direction to what is argued in **H₂**. We let the data tease out the effect of these variables.

In the literature there has been little research on the effects of income. Moorman and Matulich (1993) find income has a small positive effect as a main predictor of health information acquisition behavior. In their survey they report that only two other studies find that income has a positive and significant impact on such behavior. Higher income people can afford higher quality medical care, and therefore, have less of an incentive to educate themselves about the cost of prescription drugs. In addition, the value of time literature suggests that higher income people may have less time to devote to reading and evaluating advertisements since their opportunity cost of time is relatively higher (Becker 1981). This reasoning suggests that high-income people are more likely to "let the physician decide." On the other hand, high-income consumers are expected to be likely to be conscientious about their health and more likely to take part in their health care decisions.

3. Data Analysis and Results

3.1 Consumer Data

The IMS Health surveys are probability samples that are intended to be nationally and regionally representative. Panelists are retained for at least one year and may continue to report for two or more years. They are compensated for their time answering the questionnaire. Close to 3000 completed surveys are available. IMS defines the study objectives as follows. (1) To analyze consumer awareness and reactions to recent consumer-oriented campaigns (DTC advertisements in general, direct-to-patient programs, and patient brochures). (2) To examine the likelihood of consumers' taking specific actions as a result of exposure to pharmaceutical company sponsored programs. The sample we have corresponds to the most recent survey and has 771 respondents. We retain a randomly selected 1/3 of the observations as a holdout sample (see Table 1).

3.2 Dependent Variable

Several questions in the survey ask consumers about the utility of pharmaceutical DTC advertising on a five point scale ranging from strongly disagree to strongly agree. Since these questions will serve to construct the value of DTC advertising variable for the consumers later, we denote the questions by CV_i , $i = 1, \dots, 4$.

CV1: Advertising of a prescription to the general public is an important source of educational tool for consumers.

CV2: Advertising of a prescription to the general public provides a source of reliable information on health care.

CV3: Advertising of a prescription to the general public gives the public information that it can't get anywhere else.

CV4: Advertising of a prescription to the general public is an objective source of information.

Consumers in the survey have an overall favorable valuation of pharmaceutical advertising, as the frequency distribution of the four variables indicates. They are less likely to agree that prescription advertising is harmful, as indicated by the distribution of the fifth variable. Consumers on average prefer that pharmaceutical advertisements are distributed by a physician as the sixth variable indicates (mean value = 3.04). These findings suggest that consumers prefer to obtain prescription drug information in a professional environment (for example, pamphlets given by a health care professional that is specific to their disease state) to other forms (for example, to direct mail, magazine advertisements, or on-line information on the Internet, that are unguided and impersonal).

Table 1: Consumer Data
Correlation Matrix for the Dependent Variables

Correlation	CV1	CV2	CV3
CV2	0.70		
CV3	0.50	0.54	
CV4	0.49	0.55	0.56

Principal Component Results: Component Loadings

CV1	0.83
CV2	0.86
CV3	0.79
CV4	0.79
%Variance	66.90

Standardized Item Alpha = .83

3.3 Independent Variables

The composition of our sample is as follows. Seventy-two percent of the respondents report that they have been sick in the last six months and 47% report that they use a drug for a chronic disease or condition. (These percentages may seem high, however, the sicknesses mentioned pertain to minor diseases such as the common flu and allergies as well as more serious ones.) The consumers in the sample seek advice about a prescription drug from a physician 3 times a year, from a pharmacist 1.8 times a year, from a nurse 0.4 times a year, and from others about 0.1 times a year, on average. Thirteen percent of the respondents live with someone who is a member of the medical profession. The average number of children in the household is 0.67 (standard deviation is 1.10), the average age in the sample is 47 (std. dev. is 15.17), the average annual household income is \$41,208 (std. dev. is \$25,318), and the average education level is some college (a categorical variable)⁵.

4. Results

Since the value variables are likely to be correlated we conduct a principal components analysis to factorize them. The first and second panels in Table 2 show the correlation matrix between the dependent (value) variables, the first principal component loadings, and the percentage variance explained by the principal component. The correlation coefficients are in the expected direction. For example, the correlation between "advertising is harmful" and "advertising is useful" is negative. The correlations between attitudes towards pharmaceutical advertising in general, direct advertising to the general public, and the DTP advertising (CV1, CV2, and CV3) are positive. The "advertisements should only be distributed by a physician" variable correlates positively with the "advertisements are harmful" variable, and negatively with the rest of the variables as expected.

⁵ We check for multicollinearity across the independent variables using both correlations as suggested by McCleary and Hay (1980) and the condition indices (the ratio of eigenvalues of the $\mathbf{X}'\mathbf{X}$ matrix) as suggested by Belsley, Kuh, and Welsch (1980). With either method we are led to conclude that multicollinearity is not a problem in this data set.

Table 2: Determinants of Consumer Perceived Value towards DTC Advertising: Regression Results

Independent Variables	Total Sample	Hypertension	Depression	Allergy	Pain	Ulcer
Has been sick in the last 6 months	-0.06*	0.09	-0.07	0.08	-0.09*	-0.13
Uses a drug for chronic disease or condition	0.04	0.02	0.27***	0.02	0.04	0.22**
Seeks advice from a physician	0.01	-0.13	-0.04	-0.04	0.08	0.11
Seeks advice from a pharmacist	0.08**	0.25**	0.16	0.15*	0.04	-0.04
Seeks advice from nurse	0.07**	0.02	-0.02	0.01	0.11**	0.17**
Seeks advice from a friend/relative	0.04	0.01	-0.03	0.11*	0.05	-0.06
Lives with member of medical profession	0.01	-0.12*	-0.15*	0.01	-0.03	-0.07
Number of children	0.09**	0.18*	0.18*	0.02	0.14**	0.33***
Age	-0.01	-0.08	-0.05	0.05	0.07	0.25**
Annual income	-0.12***	-0.13*	-0.13	-0.11*	-0.11*	0.03
Education	-0.19****	-0.28****	-0.24**	-0.26****	-0.29****	-0.32***
Gender	0.01	0.04	0.10	0.15**	0.01	0.06
R-squared	0.10	0.24	0.27	0.22	0.19	0.27
Adjusted R-squared	0.08	0.18	0.16	0.17	0.15	0.17
F-test	5.89****	3.77****	2.43****	4.42****	4.60****	2.57***
N	682	155	92	197	253	95

Notes:

1. The dependent variable is the first rotated principal component that represents the consumer's valuation of pharmaceutical DTC advertising.
2. The intercept is not reported for scope considerations. Some observations are deleted due to missing values. Significance at 10% is shown by (*), at 5% by (**), 1% by (***) and less than 1% by (****).

The first principal component explains more than half (51%) of the variance. The CV2 variable loads the most heavily on this component. Therefore, we can express this component as the consumer's appreciation of the directness of pharmaceutical advertising. We regress the factor scores of the first unrotated principal component on the independent variables to test our hypotheses. Table 2 shows the results of the multiple regressions in estimation and holdout samples. Even though the adjusted R-squared is low, the F-statistic that measures the joint significance of the model is significant at 0.01 levels in both samples. (The R-squared values are typically low in large samples such as ours.) Table 3 summarizes the hypotheses and qualitative test results. Our first hypothesis is mostly supported. The significant coefficients on health motivation and ability measures suggest that consumers who use a drug for a chronic disease or condition, and consumers who often seek advice on prescription products from a pharmacist value pharmaceutical DTC advertising highly, as expected.

- The impact of children is positive but insignificant in the estimation sample, however, the impact is positive and significant in the holdout sample, as expected.
- An unexpected result is the negative impact of having been sick recently on DTC advertising. A significant negative impact is observed in both samples. (This is possibly because a person who has been sick recently is more likely to trust a physician's judgment than her/his own.)
- Our second hypothesis is supported. In the estimation sample we find that younger consumers and relatively less educated consumers are more likely to welcome direct prescription advertising. The effect of age is insignificant in the holdout sample. The effect of education is significant in the holdout sample⁶.

⁶ We also conducted a factor analysis with rotation (varimax). Two factors emerged that jointly explain 67% of the variance. The main differences of factor regressions from the above results are: (a) "having been sick recently" is insignificant for both factors and (b) "seeking advice from a physician" is significant for the second factor. Otherwise, the qualitative results are the same. For this reason and for the reason that the two factors are not qualitatively distinguishable we work with the first unrotated principal component for ease of presentation.

Table 3: Results Summary

Hypothesis	Result
H1: Some consumers prefer to exercise control over their own health care decisions and therefore are more likely to value DTC advertisements than other consumers.	
Uses a drug for a chronic condition or disease (+)	Supported.
Often seeks advice from a physician/pharmacist/nurse/friend (+)	Supported for pharmacist only.
Children (+)	Supported.
Lives with a member of the medical profession (+)	Impact is insignificant.
Has been sick recently (+)	Opposite impact found.
Education (+)	Not supported.
H2: Some consumers trust their physicians' judgment more than their own and therefore are less likely to value DTC advertisements than other consumers	
Age (-)	Supported.
Education (-)	Supported.
Often seeks advice from a physician on prescription products (-)	Impact is insignificant.
Lives with a member of the medical profession (-)	Impact is insignificant.
H3: The factors that determine the perceived value of DTC advertising by consumers vary by disease condition	Supported

Note: Expected signs of the parameters according to the hypotheses are given in parentheses.

5. Conclusion

5.1 Discussion of Results

According to the surveys we analyzed, consumers' overall perception of advertising of prescription drugs is moderately positive. However, they prefer advertisements to be distributed in the physician's office where they also receive advice from the physician regarding their personal condition. We tested whether there is consumer heterogeneity in preference to participate over decisions concerning own or family health. Our results indicate that consumers who use a drug for a chronic condition or a disease, who frequently seek advice on prescription drugs from a pharmacist, and parents, are significantly more likely to prefer participating in decisions concerning their own and their families' health. Thus such consumers are likely to discuss the advertisements with their physicians.

We also tested whether trust of physician reduces consumers' valuation of prescription advertisements. We find that consumers who have been sick recently, older consumers, and relatively more educated consumers are significantly more likely to be in this category. It appears that such consumers trust the physician's judgment more than their own and are less likely to bring the advertisements to the attention of their physicians.

Consistent with our findings, in the prior albeit short literature Alperstein and Peyrot (1993) find that regular users of prescription drugs are more likely to be aware of DTC advertising; and Moorman and Matulich (1993) find that age negatively effects health information acquisition behavior and that older consumers like advertisements to be distributed only by physicians. In the health behavior literature there have been few significant findings on the effects of income. We find that higher income people have a relatively negative valuation of prescription advertisements; however, the effect is statistically insignificant in both samples. In the physician samples we find that, on average, physicians place less utility on pharmaceutical DTC advertising than do consumers. However, physicians in the sample appear to appreciate advertisements as tools to improve interaction with patients through patients' prescription requests based on advertisements and through brochure distribution in the office. We find that more experienced physicians with a higher caseload see more utility in pharmaceutical DTC advertising than other physicians do.

We find the effect of salesforce to be insignificant with respect to the physician perception of advertising. This could be due to positive and negative impacts of sales people canceling each other. The effect could be positive because a sales representative brings information that is relatively less costly for the physician to process (an average sales visit lasts no more than four minutes according to a personal selling audit conducted by Scott-Levin Inc.).

However, sales people are also found to give inaccurate information (Ziegler, Lew, and Singer 1995). Thus the overall effect may appear nonexistent. We find strong evidence that physicians who have increased exposure to advertisements brought by their patients are more likely to value DTC advertising. Our findings contribute to the scarce literature on how consumers perceive and evaluate direct-to-consumer pharmaceutical advertising.

5.2 *Limitations and Future Research*

More detailed data sets are needed in order to measure the impact of DTC advertising on the adoption of prescription products and on changes in health care costs. We do not have sufficiently rich data on demographics and health insurance status of consumers and physicians in order to make clear empirical assessments regarding the influence of managed care on the valuation of DTC advertisements. In our empirical study we do not go into detail regarding specific drugs because the data set we have is limited in this regard.

We do not have data on the usage of drugs that are advertised, changes in the frequency of a patient's hospitalization, office visits, or lab tests to document the impact of prescription drug advertising on reduced health care costs. Moreover, the impact of DTC advertising on the collective efforts by insurance plans and pharmaceutical companies to reduce costs, such as disease management, can only be checked with more comprehensive data sets.

Since the pharmaceutical industry is characterized by several players (insurers as payers, consumers as users-deciders, and physicians as deciders), an interesting future research topic is one that explores the role of informational asymmetries on the effectiveness of DTC advertising and on the distribution of cost. Pharmaceutical manufacturers are now marketing to managed care organizations as well. Consumers, on the other hand, are becoming increasingly informed and conscientious (Schaeffer and Volpe 1999). Since elderly use the most health care resources, and since Medicare does not cover prescription drugs, perhaps increased DTC advertising will put pressure to change the coverage of Medicare and HMOs. (For a discussion of Medicare coverage see Davis et al 1999).

Another interesting issue is the diffusion of a belief that product X is good for indication Y. That is, tracking the flow of information from advertiser to consumer to physician through time and investigating how this phenomenon can be described using diffusion models is worthwhile (Bass 1969). Here again the informational asymmetries can be explored since the adopters of the new product are physicians while the influencers are the manufacturers as well as users and managed care organizations.

In summary, we need to measure the effectiveness of pharmaceutical direct-to-consumer advertising at a more micro level, for each drug and for each advertising campaign, taking into account the role of multiple players in the pharmaceutical information flow. For example, given heterogeneity of consumers and the multiple layers of influence and word-of-mouth, how does DTC change the diffusion pattern in the industry? What types of DTC advertisements increase new prescription requests and what types increase compliance? Where should firms concentrate their promotional efforts? From the perspective of the consumer, what type of promotion is the most beneficial in terms of improving health outcomes? What impact does DTC have on current usage levels of the brand being advertised and of the competing brands that may not be directly advertised? These are some of the research questions that need to be answered in future research.

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