

# The Cost-Effectiveness of Direct-to-Consumer Advertising for Prescription Drugs

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In this paper we use published information to analyze the economic value of Direct to Consumer Advertising (DTCA). The reviewed research finds that DTCA leads to increased demand for the advertised drug and that the effect of the drug tends to be class-wide rather than product specific. There is weak evidence that DTCA may increase compliance and improve clinical outcomes. However, there is little research on the effect of DTCA on inappropriate prescribing or on the characteristics of patients who respond to treatment. On net, if the advertised drugs are cost effective on average and the patients using the drugs in response to the advertisement are similar to other users, DTCA is likely cost effective. Overall, the literature to date is consistent with the idea that DTCA is beneficial, but further research is needed before definitive conclusions can be drawn.

**Keywords:** *direct to consumer advertising; cost effectiveness; prescription drugs; drug advertising*

## Introduction

Pharmaceutical companies have aggressively marketed prescription drugs for many years, with limited controversy. Prior to the advent of direct-to-consumer advertising (DTCA) in the early 1980s, drugs were advertised in professional journals, and drug company representatives made direct sales pitches to physicians (Cline & Young, 2004). These types of efforts remain the backbone of pharmaceutical promotion today, reflecting the key role physicians play as gatekeepers to prescription

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drugs. The majority of promotional dollars (55%) are spent providing physicians with free samples to distribute to their patients or on “detailing” efforts aimed directly at physicians (29%), with only 14% of promotional dollars spent on DTCA (Kaiser Family Foundation, 2003).

But in recent years, the increasing use of advertising aimed directly at the consumer has proven to be significantly more controversial. This *direct-to-consumer* advertising has been simultaneously called both educational and beneficial, and misleading and costly. However, not enough is known regarding the net benefits of DTCA.

Before 1997, there was little DTCA. Beginning in 1997, there was DTCA, but most of it was limited to print advertisements (Rosenthal, Berndt, Donohue, Frank, & Epstein, 2002; Vogel, Ramachandran, & Zachry, 2003). The key impediment to nonprint advertisements was the inability to fulfill the FDA (Food and Drug Administration) requirements for communicating the risks associated with the use of the product (the so-called brief summary) except for short “reminder” ads that could mention the name of the drug or the condition but not both. However, in 1997, the FDA issued new guidance on how advertisers could meet the “adequate provision” portion of the regulations, effectively opening up nonprint media to prescription drug advertising (Government Accountability Office [GAO], 2002). Instead of requiring the brief summary of the risks and benefits, the new guidelines required DTC advertisements to make “adequate provision” for the distribution of the information, which in practice has meant including a toll-free telephone number, a Web address, or a reference to a print advertisement (Rados, 2004). Advertisements must be submitted to the FDA; however, they do not have to be preapproved (Palumbo & Mullins, 2002), although that may change soon (Matthews, 2006). The new guidelines opened the door to television and radio advertising using specific brand names and conditions (Brownfield, Bernhardt, Phan, Williams, & Parker, 2004).

Following the 1997 FDA guidelines, DTCA spending greatly increased, from \$1.1 billion in 1997 to \$2.5 billion in 2000 (GAO, 2002) to \$4.3 billion in 2005 (Donohue, Berndt, Rosenthal, Epstein, & Frank, 2004). It is projected to increase further (Kravitz et al., 2005; Wadman, 2005). Although DTCA still only represents a small fraction of total prescription drug promotional spending—\$2.7 billion out of a total of \$19.1 billion promotional spending in 2001 (GAO, 2002)—it is the most visible and controversial portion. Questions regarding the appropriateness of appealing directly to consumers coupled with dramatically increasing prescription drug spending has led some to conclude that DTCA has caused increased spending on prescription drugs and record profits for the pharmaceutical manufacturers. Indeed, from 1997 to 2004, total spending on prescription drugs increased from \$78 billion to \$189 billion (Smith et al., 2006).

DTCA is far more controversial than the more established, and more expensive, marketing aimed at doctors (although this form of promotion is under attack as well.)<sup>1</sup> Part of this reflects visibility; most health care consumers are unaware that their doctor may have been visited by a detailer from a drug company before

prescribing a particular drug. But another source of the controversy is the notion that health care consumers are relatively ignorant about prescription drugs: They cannot adequately evaluate the benefits of particular drugs, do not understand side effects and other risks, and are not aware of alternatives that may be cheaper and more appropriate. (For one popular criticism by a former editor of the *New England Journal of Medicine*, which also criticizes advertising aimed at physicians, see Angell, 2004.) Physicians are assumed to have this knowledge, making them less likely to prescribe inappropriate medications and less susceptible to misleading or incomplete information. However, DTCA critics argue that physicians can be pressured by patients into providing inappropriate drugs.

Opponents of DTCA focus on the patient's inability to make appropriate choices and contrast it with the professional expertise of the physician in their criticisms. Often opponents trace the history of DTCA back to the marketing of "patent medicines" in the 19th century, linking the modern, highly regulated marketing of FDA-approved prescription drugs to the sleazy and ineffective "snake oil" medications of the past (Applbaum, 2006; Wilkes, Bell, & Kravitz, 2000). It has also been suggested that DTC advertisements are unbalanced; research has found that television ads spend more time discussing the benefits of a medication than the risks or drawbacks (Kaphingst, Dejong, Rudd, & Daltroy, 2004).

Furthermore, it is also suggested that DTCA adversely affects the doctor-patient relationship because DTCA often presents an overly rosy picture of treatment effectiveness, leading patients to develop unrealistic expectations regarding treatment alternatives (Perri, Shinde, & Banavali, 1999; Pinto, Pinto, & Barber, 1998; Vestag, 2005). This complicates physicians' care of patients by requiring the physicians to spend time answering questions, some of which the physicians may not be prepared to answer (Cline & Young, 2004; Perri et al., 1999). If DTC advertisements lead patients to visit the doctor and ask for prescription drugs in large numbers and if the drug is unneeded, then this represents a cost to the health care system and a social cost with no benefit (e.g., Wilkes et al., 2000). Many commentators also note that the United States is virtually alone (except for New Zealand) in allowing DTCA of prescription drugs (e.g., Brownfield et al., 2004).

Proponents generally argue that DTCA serves an educational role (Cline & Young, 2004; Masson & Rubin, 1985). DTCA, it is argued, creates a more informed patient, better able to ask questions of their doctor (Holmer, 1999). Patients may become aware of newly available medications to treat existing health conditions (Findlay, 2001). This leads to patients being better able to initiate discussions about health problems, leading to diagnoses of previously undiagnosed conditions (Mintzes et al., 2003; Perri et al., 1999; Vogel et al., 2003). DTCA may also allow patients to learn of medications that their health plan may not promote (Rubin & Schrag, 1999).

DTCA tends to be concentrated in particular drug classes. Studies have found that the top 15 advertised drugs typically represent more than half of all prescription drug advertising (Donohue et al., 2004; GAO, 2002; Rosenthal, Berndt, Donohue, Epstein, & Frank, 2003), and a relatively small number of heavily promoted drugs represents an even smaller set.

**Table 1**  
**Most Heavily Advertised Conditions and Prescription Drugs**

Condition	Drug	Government	Rosenthal et al.
		Accountability Office (2002) Estimate of Percentage of DTCA Spending <sup>a</sup>	(2002) Estimate of Percentage of DTCA Spending <sup>b</sup>
Acid reflux	Prilosec	4.8	4.4
Allergy	Flonase, Allegra, Zyrtec, Claritin	13.4	12.4
Asthma	Flovent, Singulair	5.4	4.9
Arthritis	Vioxx, Celebrex	10.6	9.7
Depression	Paxil	4.1	3.7
High cholesterol	Zocor, Pravachol, Lipitor	6.7	8.6
Impotence	Viagra	4.0	3.6
Obesity	Meridia	2.9	2.6

Note: DTCA = direct-to-consumer advertising.

a. Total spending on top 15 drugs equaled 54.5% of total DTCA spending in 2000.

b. Total spending on top 15 drugs equaled 50.1% of total DTCA spending in 2000.

**Table 2**  
**Most Heavily Advertised Conditions and Prescription Drugs, 2005**

Condition	Total DTCA Spending (×1000 dollars)	Percentage of DTCA Spending	Percentage of Advertising on Television
Lipid lowering	507,297	10.90	72
Insomnia	360,170	7.74	80
Gastrointestinal	352,948	7.58	58
Respiratory	315,626	6.78	76
Menopause/Osteoporosis	280,217	6.02	80
Nasal steroid	246,258	5.29	81
Erectile dysfunction	242,722	5.22	69
Migraine	230,613	4.96	57
Antidepressant	228,483	4.91	73
Cancer	197,439	4.24	67
Arthritis	191,087	4.11	63
Overactive bladder	189,006	4.06	74
Allergy	174,965	3.76	58
Contraceptive	170,975	3.67	75
Platelet inhibitor	152,522	3.28	75
Total on top 15 categories	3,840,328	82.52	71
Total DTCA spending	4,653,594	100	71

Note: DTCA = direct-to-consumer advertising.

**Table 3**  
**Top 10 Most Heavily Advertised Prescription Drugs, 2005**

Drug	Condition	Total DTCA Spending (×1000 dollars)	Percentage of DTCA Spending	Percentage of Advertising on Television
Lunesta	Insomnia	227,882	4.69	78
Nexium	Gastrointestinal	205,862	4.23	62
Vytorin	Lipid lowering	163,245	3.36	64
Crestor	Lipid lowering	159,799	3.29	71
Plavix	Platelet inhibitor	152,522	3.14	75
Advair	Respiratory	138,510	2.85	72
Nasonex	Nasal steroid	133,643	2.75	80
Ambien	Insomnia	132,262	2.72	83
Lamisil	Antifungal	126,000	2.59	88
Lipitor	Lipid lowering	125,112	2.57	89

Note: DTCA = direct-to-consumer advertising.

Historically, the top drug class for DTCA is allergy medications, with drugs in this class including slightly less than one out of every seven dollars spent on DTCA (Table 1). These include prescription drugs such as Flonase, Allegra, and Claritin. The number two drug class is arthritis medications, with approximately 10% of total DTCA spending. Medications in this class include Celebrex and Vioxx. The GAO suggested that the top 15 DTC-advertised drugs in the year 2000 were for seven chronic conditions: six for allergy or asthma, three to treat high cholesterol, two for arthritis, and one each for acid reflux, depression, obesity, and impotence (GAO, 2002).

More recently, the top advertised class of medications has been lipid-lowering drugs, such as Vytorin, Crestor, and Lipitor (Table 2). These medications all serve to lower the level of “bad” cholesterol in the blood, reducing the risk of cardiovascular disease. Lipid-lowering drugs are followed by drugs treating insomnia, gastrointestinal disorders, and allergies (Nasonex).

Individually, the top drugs are Lunesta (for insomnia), Nexium (for gastroesophageal reflux disease), and the lipid-lowering medications Vytorin and Crestor (Table 3). Combined, the top 10 advertised drugs represented nearly one third of the total DTCA spending. The majority of DTCA spending was on television advertising for all the top 10 medications. The percentage spent on television varied from a low of 62% for Nexium to a high of 89% for Lipitor.

## New Contribution

In this article, we examine the question of the effect on economic welfare of DTCA. This article critically reviews existing literature on the impact of DTCA on

patients, doctors' willingness to prescribe drugs, changes in prescription drug use, and the costs associated with the extra visits to physicians, the advertising, and the prescription drugs themselves. It then analyzes the existing evidence with a focus on the likely economic welfare effect of drugs consumed in response to a prescription drug advertisement.

## Materials and Methods

We searched a wide range of health, economic, and "grey" literature. Databases included Cinahl, Medline, Medline Plus, and Google Academic. We also searched the Internet using the Google search engine. Search terms included *drug advertising*, *direct to consumer drug advertising*, and *DTC advertising* with and without the term *prescription*. The reference lists of related studies were also examined for related articles.

We reviewed the literature in three different areas: the impact of DTC prescription drug advertising on consumers seeking out prescription drugs, the prescribing patterns of physicians when patients seek out prescription drugs, and the overall impact of the DTCA on cost.

### Cost-Effectiveness and Direct-to-Consumer Advertising

Cost-effectiveness asks the following question: Is the additional health gained from an intervention sufficient to justify the societal costs incurred? Gains are often measured using some form of a *QALY*, that is, a quality-adjusted life year. Analysts calculate the cost per QALY gained, and if that ratio is below a threshold, then the treatment is considered cost-effective, whereas if it is above that, then the treatment is not cost-effective. One suggested rule of thumb is that treatments below \$50,000 per QALY gained are considered very cost-effective, and treatments below \$100,000 per QALY gained are cost-effective (Ubel, Hirth, Chernew, & Fendrick, 2003).

To think about the cost-effectiveness of DTCA, it is necessary to frame the question by describing the intervention. We may view the intervention as the advertising itself or as the prescription drug that is consumed in response to the advertising. However, in either scenario, the costs calculated and the gains accrued will be identical.

At first blush, the answer to the question of the cost-effectiveness of prescription drug advertising appears obvious. The cost-effectiveness of DTCA will be a function of the cost-effectiveness of the advertised drugs, which are generally well established as being cost-effective. For example, 3 of the top 10 advertised drugs in 2006 were in the class of medications known as statins, which are highly effective and generally considered to be safe (Shepherd et al., 1995). Overall, research indicates that targeted statin therapy for the primary prevention of cardiovascular events can be cost-effective (Pearson, Laurora, Chu, & Kafonek, 2000). For example, Glasziou et al. (2002) estimated that the discounted long-term cost per life year gained for

pravastatin in Australia is \$10,938. This includes a 22% reduction in mortality over 6 years and a 20% decline in hospitalization costs for all vascular events.

Can these cost-effectiveness ratios be applied to individuals who consume the drug as a result of DTCA? One obvious difference is the additional cost of the advertising itself, which increases costs and may thereby decrease the cost-effectiveness ratio. However, if the price of the drug does not change, then advertising will only reduce the profit per unit for the manufacturer (unless average production costs decrease because of increased output) and not change the cost-effectiveness ratio. This argues that if the drug is cost-effective, and advertising does not affect the price, then the consumption of advertised drugs is necessarily cost-effective. However, this simple analysis ignores several additional issues that may also have an impact.

From an economic welfare perspective, the desirability of advertising depends on the trade-off between potentially increased market prices and reduced search costs. Higher prices will benefit producers at the expense of consumers, whereas reduced search costs will benefit consumers by lowering the true cost of the product (Stivers & Tremblay, 2005). Thus, the first critical issue is the effect of DTCA on the price of the advertised drugs. If consumers simply pay more for the same drugs or switch from a low-priced drug to an equivalent higher priced drug (e.g., from a generic to a name brand), then social welfare is not enhanced and the cost-effectiveness is diminished.

Second, many observers are concerned that advertising of drugs will lead to many patients seeking prescriptions that they may not need (a concern reviewed in detail further on in the article). Normally, economics would argue that so long as consumers are willing to pay the price associated with the visit, this is not a concern. The complication is that the visit to the physician's office is typically paid for by insurance, not the patient, so that there is moral hazard in consumption of physicians' services. The drug advertising thus creates a negative externality for the insurer (which is often the government) creating economic inefficiencies. From a cost-effectiveness perspective, the "false positive" visits—visits to the physician seeking an inappropriate medication—increase the total cost of the "true positives" who appropriately receive the prescription. Thus, an increase in visits seeking a prescription, which is not, after professional assessment, needed, will result in lower cost-effectiveness for persons seeking a prescription because of an advertisement they viewed than for those diagnosed in more traditional ways.

Third, there may be a difference in patient characteristics between individuals on whom the cost-effectiveness ratio was calculated and those seeking treatment in response to a prescription drug advertisement. Cost-effectiveness ratios often depend on the clinical characteristics of the treated population. For example, although research indicates that targeted statin therapy for the primary prevention of cardiovascular events can be cost-effective (Pearson et al., 2000), the higher the risk of a cardiovascular event, the lower the cost per QALY. Thus, because men have a higher underlying risk of cardiovascular events, statin therapy for a 58-year-old man costs \$48,100 per QALY gained but \$94,400 per QALY gained for a woman of the same age (Blake, Ridker, & Kuntz, 2003). So if individuals responding to drug advertising are systematically different from a more "typical" patient population, then the standard

**Table 4**  
**The Effect of DTCA on Demand**

Authors	Advertised Drug	Date of Sample	Effect on Demand	Comment
Basara (1996)	Injectable migraine treatment	1993-1994	New drug sales 10% higher in markets with DTCA than those without	
Calfee Winston, and Stempski (2002)	Cholesterol-reducing drugs (statins)	1995-2000	None	Increased compliance rates
Bradford, Kleit, Nietert, Steyer, and OrNSTein (2006b)	Cholesterol-reducing drugs (statins)	1998-2004	Highest levels of advertising associated with 6% increase in likelihood of attaining treatment goals	Sample consisted of patients who used statins
Berndt, Bui, Reiley, and Urban (1995)	Antiulcer (Tagamet, Zantac, Pepcid, and Acid)	1977-1994	Positive effect, but DTCA weakest form of marketing	Monthly data; controlled for physician detailing; effect depends on market structure
Ling, Berndt, and Kyle (2002)	Antiulcer	1988-1999	No effect on market share for firms, but increases market size	DTCA increases competition and rivalry between firms
Donohue and Berndt (2004)	Antidepressant	1997-2000	A one standard deviation increase in DTCA (\$43,816) increases demand by 0.5% but increases the demand for depression medications overall	Used claims data; DTCA much less effective on the margin than physician detailing
Bradford et al. (2006a)	COX-2 inhibitors (Vioxx and Celebrex)	2000-2002	10-Fold increase in Vioxx DTCA induced a 0.5% increase in Vioxx prescribing	DTCA for Vioxx increased demand for both products, but DTCA for Celebrex only affected demand for Vioxx
Zachry et al. (2002)	Antihistamines, antihypertensives, acidic disorder medications, benign prostatic hypertrophy medications, and antilipemics	1992-1997	No effect for antihypertensives or benign prostatic hypertrophy medications but positive effect for antihistamines and	Where significant, DTCA explained 10%-30% of the variation in advertising

(continued)

**Table 4 (continued)**

Authors	Advertised Drug	Date of Sample	Effect on Demand	Comment
Rosenthal et al. (2003)	Antidepressants, antihypertipidemics, proton pump inhibitors, nasal sprays, and antihistamines	1996-1999	antilipemics; every \$1,000 spent of DTCA for antilipemics was associated with 32 new diagnoses and 41 prescriptions; significant spillover effects between drugs	
			A 10% increase in DTCA is associated with a 1% increase in sales	
Iizuka and Jin (2005)	151 Drug classes	1994-2000	\$28 Increase in DTCA leads to one drug visit within 12 months	This suggests that one effect of DTCA is to expand the overall market size

Note: DTCA = direct-to-consumer advertising.

cost-effectiveness ratios for those patients will also be different. The remainder of the article is organized around these three issues: the impact of advertising on prices, the impact on other (nondrug) providers, and evidence regarding differences in patients who seek treatment as a result of drug advertising.

### **The Impact of DTC Prescription Drug Advertising on Prescription Drug Prices, Spending, and Use**

One of the key debates has been the issue of the impact of DTCA on drug spending. Studies of the question have consistently found that DTCA is associated with increases in spending on prescription drugs (see Table 4). This is true both pre-1997 (Basara, 1996; Stern, 1994) and post-1997 (Gilbody, Wilson, & Watt, 2005). But the reason for the increase in spending is less clear.

Prescription drug spending could increase as a result of DTCA in one of three ways. The advertising could lead to higher prices for advertised drugs; it could lead to increased use of drugs; finally, it might lead to substitution from less expensive to more expensive drugs for the same condition. The implications of these three effects are quite different. If increased spending is because of higher prices, then this suggests that the primary impact of DTCA is to create a more inelastic demand for particular drug products, which is not necessarily welfare enhancing. Conversely, if the primary effect is to increase the use, then the welfare impact will be driven by the value of the drug (assuming no selection effects). If the effect is caused by substitution to more expensive drugs in a class, then the welfare effects will depend on whether any increased benefits of the advertised drug relative to the previously used drug are cost-effective.

In a 2002 review of the literature, the GAO concluded that the majority of the increased spending was because of increased use, not because of higher prices (GAO, 2002). GAO reports that between 1999 and 2000, use for the most heavily advertised drugs increased by 25%, whereas prices rose by 6%. For drugs that were not heavily advertised, the use increased by 4% and prices by 9%. A similar finding is reported by Berndt (2001) and in a review by Vogel et al. (2003). One contrary finding was reported by Calfee et al. (2002), who examined statin use before and after the 1997 change in FDA DTCA regulations and found no evidence that advertising affected prescription demand, number of pills, revenues, or market shares. However, this study linked national data to national prescriptions, rather than using more specific market-by-market data.

This issue is strongly related to the question of whether DTCA tends to expand market shares for individual products or whether DTCA expands the overall market for the class of drugs. If DTCA expands an individual product's market share at the expense of that of its competitors, then it will tend to make the demand for the advertised product less elastic, allowing sellers to charge higher prices. The welfare effects of this change would depend on the relative merits and prices of the advertised drug

and substitutes. However, to date, most of the evidence suggests that DTCA expands overall market size rather than individual product market share. Ling et al. (2002) find that DTCA for prescription drugs does little for an individual products' market share but instead expands the overall size of the market; this is in contrast to the over-the-counter DTCA, where the opposite result was seen. Similarly, Donohue and Berndt (2004) report that DTCA for antidepressants had little impact on drug choice but increased the probability that an individual diagnosed with depression received antidepressant treatment. Both studies attribute the lack of impact of DTCA on a particular drug's market share to the physician acting as the patient's agent. Berndt et al. (1995) found a more mixed result in an early (using pre-1997 data) study of H<sub>2</sub>-antagonists (such as Tagamet and Zantac), with DTCA affecting both market share and market size.

Bradford et al. (2006b), in a study of local and national DTCA for the COX-2 inhibitors Vioxx and Celebrex, found that Vioxx advertisement increased Vioxx prescriptions and had a smaller effect on Celebrex prescriptions, whereas Celebrex ads only increased Vioxx prescriptions and had no effect on Celebrex sales. This study then is consistent with the idea that patients respond to advertisements and that there is significant spillover between drug advertisements. Similarly, Donohue et al. (2004) used a commercial claims database to show that DTCA for depression medications significantly increased the probability of a depression medication being dispensed for those diagnosed with depression during an outpatient visit.

However, Zachry et al. (2002) report that the effect of DTCA on use varies by drug type. DTCA had no impact on the number of prescriptions written or diagnoses for benign prostatic hypertrophy or antihypertensives. For antilipemics (Zocor), every \$1,000 spent on DTCA yielded 32 new diagnoses and 41 antilipemic prescriptions. Of the 41 antilipemic prescriptions, 23 were for Zocor.

Overall, the advertising demand appears to be relatively inelastic. A Kaiser Family Foundation (2003) study found that every 10% increase in DTCA led to a 1% increase in prescription drug spending (Rosenthal et al., 2003). The authors estimate that this indicates that every \$1 spent on DTCA yields \$4.20 in additional sales. More recently, Iizuka and Jin (2005) find that a \$28 increase in monthly DTCA leads to one patient visit within 12 months.<sup>2</sup>

## **Externalities Associated With Direct-to-Consumer Advertising**

Physician groups have been very vocal in their opposition to DTCA of prescription drugs because of concerns about changes in the doctor-patient relationship and because of fears that advertising may lead to many patients seeking unneeded treatments. In contrast, consumers like DTCA. Murray, Lo, Pollack, Donelan, and Lee (2004) report that 47% of consumers hold the view that DTCA is either good or very good, and only 19% hold the view that it is bad or very bad (Murray et al., 2004). Three quarters of patients think that DTCA increases their awareness of new drugs,

and most (58%) felt that the ads provided sufficient information to allow the consumer to decide whether to discuss the drug with their doctor (Aikin, Swasy, & Braman, 2004). Women, in particular, felt more in control during their visit to the doctor (Murray et al., 2004).

Despite the official opposition of physician's groups, individual doctors are not as opposed. The FDA found that 41% of doctors believed that DTCA led to benefits, whereas 18% believed that it led to problems (Aikin et al., 2004); 73% of physicians agree or strongly agree that DTCA helps educate and inform patients, and 67% agree or strongly agree that it helps the physician have better discussions with the patient (Weissman et al., 2004). Some patients report that doctors acted as if they were being challenged when the patient brought up the issue of an advertised drug (Murray et al., 2004). However, the FDA found that 90% of patients reported that doctors welcomed their questions (Aikin et al., 2004).

This may be because scheduling a visit to a doctor specifically in response to a DTC advertisement is rare; the FDA reports that only 4% of patients made a visit to a physician with the primary purpose of asking about an advertised drug. More commonly, patients asked about an advertised drug during an already scheduled visit (Aikin et al., 2004; Murray et al., 2004). Potential patients typically respond to the advertisements by talking to their doctor about the advertised drug. Overall, 14% of survey respondents discussed a health concern with their doctor as a result of a DTC advertisement. Consumers understand that the materials are promotional and seek their doctor's advice about the appropriateness of particular medications; however, the advertising increases awareness of treatment possibilities (Young, Paterniti, Bell, & Kravitz, 2005). Only 6% of patients expected to receive a prescribed medication during a physician visit because of DTCA (Aikin et al., 2004). When patients ask for a prescription drug they have seen advertised, doctors generally respond by doing something, although they often do not prescribe the requested drug. Physicians prescribed the DTC-advertised drug 39% of the time, a different drug 22% of the time, and took no action 18% of the time (Weissman et al., 2004).

Physicians accommodate patients' requests either because the requested drug was the most effective available or is equally effective as other alternatives; only 5.5% of the time did physicians prescribe a DTC-advertised drug despite believing that another drug was more effective (Weissman et al., 2004). Doctors considered the advertised drug requested by the patient to be a "very likely" choice 54% of the time (Mintzes et al., 2003). Physicians were more likely to be ambivalent about prescribing nonadvertised, but requested, prescription drugs than DTC-advertised drugs requested by patients (Mintzes et al., 2002).

Advertising tends to focus on drugs that are newer (Donohue et al., 2004) and targeted at undertreated illnesses (Iizuka, 2004). The FDA found in surveys that among patients who visited a doctor and asked for a prescription drug by brand name, 88% had the underlying condition that the prescription drug seeks to treat (Rados, 2004). Three quarters of patients who received a prescribed medication after

visiting the doctor because of DTCA reported feeling much or somewhat better overall (Weissman et al., 2003).

It also appears that DTCA may lead to improved quality of care. In one of the clearest examples to date, Kravitz et al. (2005) found that consumers' asking providers for advertised drugs led to superior care. In a randomized controlled trial, only 31% of patients presenting with major depression received appropriate depression medications. In contrast, 76% of patients asking for the correct medication received appropriate depression medications, whereas 53% of patients who asked for a specific (and appropriate) brand name drug received appropriate depression medications. However, Kravitz et al. also found that patients presenting with symptoms of adjustment disorder with depressed mood, for whom a depression medication is not clinically indicated, were also more likely to receive a depression prescription if they asked for it.

## **Selection Effects**

Increased use from DTCA can occur either by new consumers responding to the ad and obtaining prescriptions or by increased use by those patients who already have a prescription—that is, increased compliance. In either of these situations, there is the potential for a selection effect whereby the individuals who respond to an advertisement are systematically different from those who do not. There is relatively little evidence about the effect of advertising on compliance and even less on the selection effects among new patients.

The most straightforward way that selection could occur is if those who seek out drugs in response to DTCA are systematically either more or less severe in their illness than the "typical" person who is prescribed the drug. We were unable to locate any published articles that examined this question directly, although there is much speculation that such selection occurs. This is a fruitful area for further research.

However, some individuals may not seek out a new drug in response to DTCA but, instead, may either restart existing prescriptions or adhere better to already prescribed drug regimens. Certainly, patient compliance with prescribed medications is a significant public health issue. Dezii (2000) found that 70% of patients do not comply with their prescribed drug treatments, with an annual societal cost of \$170 billion, which exceeds total drug expenditures. More than 1 in 10 hospital admissions have been blamed on noncompliance (Col, Fanale, & Kronholm, 1990) as well as 125,000 cardiovascular deaths per year (Sullivan, Kreling, & Hazlet, 1990). One of the benefits cited for DTCA is improved compliance (Armantier & Namoro, 2006). If this is the mechanism by which DTCA increases demand, then the selection effect becomes dependent on a comparison of patients with high and low adherence rates within drug classes affected by DTCA.

But the evidence regarding the effect of DTCA on compliance is limited and mixed. Donohue et al. (2004) found no effect of DTCA on compliance with a 4-month

treatment regimen for depression for the advertised drug, but there was a small effect for the drug class. For statins, Bradford et al. (2006b) found that patients beginning statin therapy (for which there is a clinical need for uninterrupted treatment but also frequent noncompliance, e.g., Abughosh, Kogut, Andrade, Larrat, & Gurwitz, 2004; Ellis et al., 2004; Pearson et al., 2000; Thiebaud, Patel, & Nichol, 2007) during months of high DTCA were more likely to achieve low-density lipoprotein cholesterol blood-level goals after treatment. Patients beginning treatment in high-advertising months (defined as the top quartile of advertising) were 6% more likely to achieve their goals. However, the effect was only significant for those with the least stringent goals. Finally, Wosinska (2005) found that advertising prior to the initiation of therapy for hyperlipidemic patients leads to higher compliance, perhaps suggesting an interaction between patient motivation and advertising. Also, advertising for any brand drug increases compliance across the drug class, although the effect size is small.

### **Conclusion: Is DTCA Incrementally Cost-Effective?**

As part of the prescription drug approval process, pharmaceutical manufacturers evaluate the cost-effectiveness of the new products. In some countries, like the United Kingdom, a company is required to demonstrate cost-effectiveness before the drug can be sold. In the United States, the competition is more generally over inclusion in the lower tiers of formularies, but the same pressure applies for drugs to be cost-effective.

DTCA increases prescription drug expenditures. That result is found consistently across the literature and is consistent with the pharmaceutical companies' decision to spend resources on DTCA; after all, unless the pharmaceutical companies had perceived that DTCA increased drug sales, it is unlikely that they would spend several billion dollars on it. However, nearly *all* use of prescription drugs—advertised or not—increases health care costs. Society has judged many products to be cost-effective in the sense that the benefits provided by the products are worth the additional costs. Does this same rationale carry over to DTC-advertised drugs?

There are a number of ways in which DTC advertisements could yield incremental costs greater than their benefits. First, if a large number of individuals who do not need or who are for some reason poor candidates for the prescription drug make office visits to ask for the advertised drug, then the DTCA will generate costs for the health care system without offsetting benefits. However, this does not appear to be the case. As shown in Table 5, although the overwhelming majority of consumers remember having seen DTC advertisements (with estimates ranging from 75% to 94%), most do not ask their doctors about DTC-advertised drugs. Estimates of the proportion of potential patients who actually ask for an advertised DTC prescription drug range from a low of 4.0% to a high of 13.8%, and of those who ask for an advertised

**Table 5**  
**Impact of DTCA on Consumers Seeking out Prescription Drugs**

Survey	Percentage Who Remembered Seeing DTC Advertisement	Percentage Who Asked Their Physician About the Advertised Drug	Percentage Who Asked Their Physician for the Advertised Drug	Percentage Who Received a Prescription for the Advertised Drug	Ratio of Individuals Who Asked for Advertised Drug to Those Who Received Advertised Drug
<i>Prevention Magazine</i>	80	31	8.7	7.3	83.9
GAO (2002)	75	25	13	6.5	82 <sup>a</sup>
Murray et al. (2004)	83	10	5.8	4.0	68
Weissman et al. (2003)	86	35	—	13.8	—
Mintzes et al. (2002); Mintzes et al. (2003)	94	—	12	9	75

Note: DTCA = direct-to-consumer advertising.

a. 32% Received a drug different from the one they asked for.

prescription drug, the vast majority receive it. Moreover, as mentioned above, most of the time when patients ask for a drug it is in the context of a visit scheduled for another purpose.

Another possibility is that physicians feel pressured to prescribe drugs that are inappropriate. The physician surveys discussed earlier suggest that physicians overwhelmingly report that they feel that the prescribed drug is appropriate. Yet it is unethical for physicians to prescribe products that are inappropriate, so the finding that physicians report that they do not do so is not surprising.

Consider Viagra—the medication that brought the term *erectile dysfunction* into the common lexicon. Although Viagra does not extend life, it can substantially improve the quality of life, yielding QALY gains. Erectile dysfunction was typically treated prior to Viagra by injection therapy using papaverine-phenolamine, which was both less convenient and less effective (Stolk, Busschbach, Caffa, Meuleman, & Rutten, 2000). Viagra has been found to be cost-effective in clinical trials, costing an estimated \$6,877 per QALY gained,<sup>3</sup> well within the range of cost-effectiveness. Stolk et al. (2000) estimate the cost of a year's prescription of Viagra in the United Kingdom to be equal to \$480, including the cost of 3.8 physician visits and medication costs. If the cost of the DTCA is included, then the incremental cost per pill increases by approximately \$1.96, increasing the total cost for 1 year of treatment by \$18.82. The cost per QALY gained increases to \$7,147, still well below the conventional cost-effectiveness threshold.

Moreover, this may be an overstatement of the actual cost per QALY gained. Because it is relatively rare for patients to make an appointment specifically in response to an advertisement, the cost of the initial visit included in the above calculation would be reduced to the value of the marginal time spent discussing the

treatment possibilities. Assuming that this discussion is shorter than the stand-alone appointment modeled in Stolk et al. (2000), the cost per QALY gained will be lower.

But this analysis assumes both that the treatment itself is incrementally cost-effective and that those using the treatment are similar to the typical treated patient. There are certainly reasons to question the accuracy of cost-effectiveness ratios because they suffer from a host of biases ranging from nonrepresentative samples to publication bias. But if one accepts the published cost-effectiveness ratios as valid, then DTCA leads to an increasing use of cost-effective treatments assuming that the individuals who seek treatment in response to DTCA are similar to those who seek treatment in other ways. There is relatively little literature on this point, to date, and this area is a fruitful one for further research.

More research is also needed to fully understand the impact of DTCA on the use of appropriate medications, on medication compliance, and on the use of medications for untreated conditions. Much of the research to date has relied on health care claims data, which implicitly assumes that the correct diagnosis has been made by the physician. But the work by Kravitz et al. (2005) suggests that although DTCA may lead to patients being more likely to receive needed drugs, some patients may receive inappropriate drugs as well.

Some of the products that pharmaceutical companies have typically advertised— allergies, erectile dysfunction, arthritis—lend themselves to self-diagnosis. Indeed, the most common newly diagnosed condition resulting from a DTC advertisement-induced physician's visit is allergies (Weissman et al., 2003). In other cases, such as the statins, patients can identify risk factors that may make the medicine useful. The finding that physicians typically do prescribe something in response to a patient request resulting from a DTC advertisement is likely, in large measure, because of the particular conditions advertised. Of course, it is in the interests of pharmaceutical companies to undertake advertising that will lead to some action by consumers, so this result is not surprising.

To date, research has shown fairly convincingly that advertising leads to increased demand for the advertised drug and that the effect of the drug tends to be classwide rather than product specific. There is weak evidence that DTCA may increase compliance and improve clinical outcomes. However, there is little research on the effect of DTCA on inappropriate prescribing or on the characteristics of patients who respond to treatment. The literature to date is consistent with the idea that DTCA is beneficial, but further research is needed before definitive conclusions can be drawn.

## Notes

1. For example, a senate bill proposed by Senators Grassley and Kohl with several cosponsors (The Physician Payments Sunshine Act of 2007) would require all drug companies and sales representatives to report to the Department of Health and Human Services all gifts and payments of more than \$25 from drug companies to physicians. Some states have already passed similar laws.

2. Interestingly, this result is very similar to the finding reported by Zachry et al. (2002): If every \$1,000 spent on DTCA yielded 32 new diagnoses, then every \$24.39 spent on advertising leads to one new patient.

3. Converting U.K. pounds to U.S. dollars, in 2000 dollars.

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