Benefits and harms of direct to consumer advertising: a systematic review

S Gilbody, P Wilson, I Watt

Background: Direct to consumer advertising is increasingly used by the pharmaceutical industry, but its benefits and harms have yet to be summarised in a comprehensive and rigorous manner.

Methods: A systematic review was conducted of robust evaluations of the impact (positive and negative) of direct to consumer advertising. A broad range of databases and data sources (including Cinahl, Embase, HMIC, HSRR, Medline, PsycInfo, and the internet) were searched from inception to 2004.

Results: From 2853 citations only four reports were found that met the strict inclusion criteria and provided usable results. Direct to consumer advertising is associated with increased prescription of advertised products and there is substantial impact on patients’ request for specific drugs and physicians’ confidence in prescribing. No additional benefits in terms of health outcomes were demonstrated.

Discussion: Direct to consumer advertising is banned in most countries, and the research evidence tends to support the negative impact that is feared by those who support a legislative ban. Further research is needed into the clinical and economic impact of direct to consumer advertising in healthcare systems.

METHODS
We carried out our systematic review according to clear guidelines set down by the UK NHS Centre for Reviews,7 and our results are presented according to guidelines laid down in the QUOROM statement."
• health seeking behaviours of patients at the point of access to care;
• requests for prescription only medicines;
• patient-doctor communication and satisfaction with care;
• prescribing patterns;
• direct and indirect costs (including drug costs, healthcare and social costs).

Studies that only reported knowledge and awareness of advertising campaigns were excluded.

Mass media and population level interventions such as DTCA are rarely evaluated using randomised designs. However, in order to draw causal inference from studies examining population level interventions, it is important to use control groups or comparative historical time periods.

For this reason, we decided to extend our inclusion criteria beyond the conventional randomised controlled trial. In line with guidelines suggested by the Cochrane Effective Practice and Organisation of Care (EPOC) group, the following study designs were included: randomised controlled trials, controlled clinical trials, controlled before-and-after studies, and interrupted time series analyses. We also included cross-sectional surveys where they included a control or comparison group. We sought full economic evaluations based on the above epidemiological designs, combining cost and consequence.

**Study selection**

The results of our literature searches were scrutinised independently by two researchers. References to studies which could potentially be included were ordered and scrutinised further. A flow diagram describing the inclusion and rejection of studies is shown in fig 1.

**Data extraction, quality assessment, and research synthesis**

Data were independently extracted by two researchers. Data on study design, population, intervention, outcomes, results, and method of analysis were initially summarised in a tabular form. Study quality was assessed according to accepted criteria.

We anticipated that substantial heterogeneity in terms of study design, populations, and mode of DTCA might be found among the studies, making a formal statistical method of synthesis (meta-analysis) inappropriate. We therefore conducted a descriptive synthesis in line with accepted guidelines. Salient design features and outcomes were considered, with due reference to the overall quality of the evaluation. For example, prospective controlled studies were considered superior to cross sectional studies, and interrupted time series were considered to be interpretable when several time points before and after the intervention or introduction of DTCA were presented.

**RESULTS**

Our searches identified 2853 publications from which only four studies (six publications) met our strict inclusion criteria and provided usable data (table 1). Very few of the reports identified by our searches did, in fact, represent actual evaluations of the impact of DTCA. Of the studies that did not fulfill our strict inclusion criteria, many were reports of the impact of DTCA in increasing brand awareness in the form of population surveys and opinion polls—for example, a national survey of consumer reactions to direct to consumer advertising—these were not included as they were neither controlled nor did they examine actual behaviour or our specified healthcare outcomes. Of the studies that did directly examine the impact of DTCA in relation to health care, common reasons for exclusion were: the failure to use a control group in cross sectional studies or descriptions of spending on DTCA without reference to a specific drug or product or clinical context. Of the economic studies that were identified, none combined cost and consequence within the context of a robust epidemiological design, but either described drug costs alone or relied on economic modelling and econometric prediction.

Of the four included studies, three were interrupted time series, comparing periods of time before and after the introduction of DTCA. Two interrupted time series studies conducted in the US found a significantly increased trend in the prescribing volume of drugs that had been the subject of DTCA campaigns. The effect of DTCA seemed to both increase the number of new diagnoses of a condition and tended to increase the proportion of prescriptions specifically for the advertised drug. For example, Zachry et al found that advertising budgets for cholesterol lowering drugs increased year on year during the 1990s, and that every $1000 spent advertising cholesterol lowering drugs was associated with approximately 32 extra people being diagnosed with hyperlipidaemia and 41 advertised cholesterol lowering drugs being prescribed. Similarly, Basara found that a specific campaign for a migraine treatment (sumatriptan) was associated with a marked increase in sales over the first month of a campaign (p<0.0006) which, if extrapolated across the US market, was associated with $11.5 million in sales annually.

A European study examined the impact of a mass media campaign sponsored by a pharmaceutical company to increase awareness of and treatment for a fungal nail condition (onychomycosis). A ban on product specific DTCA prevented the company naming their product, but the overall “awareness campaign” was associated with both an increase in new prescriptions and the market share of the company’s specific antifungal agent (increased prescribing volume during the period of the campaign from 6.50 prescriptions per 1000 person years (95% CI 6.33 to 6.66) to 15.2 (95% CI 13.5 to 16.9)).

A controlled study by Mintzes and colleagues examined the impact of DTCA in the US compared with Canada (where DTCA is banned, although cross border exposure to DTCA still exists) using a cross sectional survey of physicians and patients. Patients in the US were more likely to request DTCA drugs (7.3% v 3.9%, OR 2.2, 95% CI 1.2 to 4.1), and physicians in both settings were more likely to acquiesce to these

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**Figure 1** QUOROM study flow diagram.

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### Table 1: Comparative studies examining the impact of direct to consumer advertising which fulfilled inclusion criteria

<table>
<thead>
<tr>
<th>Study and design</th>
<th>Population/setting</th>
<th>Intervention</th>
<th>Outcomes studied and follow up</th>
<th>Results</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basano et al.</td>
<td>US primary care</td>
<td>DTCA invisted after 1993</td>
<td>New prescription volume (monthly aggregates) of drugs subject to DTCA. Derived from &quot;physician level&quot; prescribing data</td>
<td>DTCA resulted in increased prescribing volume ($R^2=0.90$, $p&lt;0.00001$). The sustained increase in prescription volume was subject to exponential decline as the marketing campaign progressed.</td>
<td>Clustering of physician and demographic characteristics accounted for in design and analysis.</td>
</tr>
<tr>
<td>Mintzes et al.</td>
<td>Primary care</td>
<td>DTCA of any type used in US (1999–2000)</td>
<td>Patients belief that they needed medicine</td>
<td>Patients believed that they needed medication more often in Sacramento than in Vancouver (OR 2.1, 95% CI 1.5 to 4.3). Specific belief that they should be a DTCA drug was higher (OR 1.4, 95% CI 1.1 to 1.8). Most common request for branded antihistamines was for regional antihistamines (95% CI 1.2 to 4.1).</td>
<td>Clustering and demographics accounted for in design and analysis.</td>
</tr>
<tr>
<td>’t Jong et al.</td>
<td>Netherlands primary care</td>
<td>DTCA mass media campaign</td>
<td>Prescription volume of terbinafine (product of the company, initiating the awareness campaign)</td>
<td>Prescription volume for terbinafine increased during the period of the campaign from 6.50 prescriptions per 1000 person years (95% CI 6.33 to 6.66) to 15.2 (95% CI 13.5 to 16.9).</td>
<td>Scant methodological details making it difficult to comment on method of analysis. However, several data points available before and during the campaign.</td>
</tr>
<tr>
<td>Zachry et al.</td>
<td>US primary care</td>
<td>DTCA mass media campaigns for five classes of prescription-only medicines (antihistamines, antihyperlipidaemic, anti-ulcer drugs, benign prostatic hypertrophy (BPH) drugs, and cholesterol lowering drugs)</td>
<td>Monthly advertising expenditure for named DTCA drugs</td>
<td>A positive association ($p&lt;0.05$) between advertising expenditure, by class and by named drug, and prescribing decisions. Regression analysis showed that every $1000 spent advertising cholesterol lowering drugs was associated with approximately 31 people diagnosed with hyperlipidaemia and 41 cholesterol lowering drug prescriptions being written.</td>
<td>Clustering and intercorrelation of data points included in analyses. Several data points available before and during the DTCA campaign.</td>
</tr>
<tr>
<td>Research database</td>
<td>Research database containing prescription information on 150 practices (470775 patients, 1.5 million patient years) between 1996 and 2002</td>
<td>Advertising campaign between 2000-2001</td>
<td>Prescription volume of terbinafine (generic drug also available)</td>
<td>Prescription volume for terbinafine fell from 6.84 prescriptions per 1000 person years (95% CI 6.80 to 6.88) to 6.07 (95% CI 5.86 to 6.28) in 1999 to a peak of 8.2 (95% CI 7.9 to 8.6) in 2000–1 and fell to 4.9 (95% CI 4.6 to 5.1) per 1000 person years in 2002.</td>
<td></td>
</tr>
<tr>
<td>Research database</td>
<td>Research database containing details of 195577 clinician encounters from 1992 to 1997 correlated with an advertising database detailing all advertising expenditure for named drugs subject to direct to consumer advertising (including TV, radio, print media)</td>
<td>Advertising campaigns between 1992 and 1997. Campaigns had to last for a minimum of 18 months</td>
<td>Prescription volume for branded drugs</td>
<td>New diagnosis for the advertised drugs’ FDA approved indications. Prescription volume for drugs belonging to the same class</td>
<td></td>
</tr>
</tbody>
</table>

DTCA, direct to consumer advertising.
requests despite feeling ambivalent about the drug that was prescribed. Those who requested a specific DTCA drug were 16 times more likely to receive a drug than those who did not request a specific drug (OR 16.9, 95% CI 7.5 to 38.2).

No studies were found that examined the impact of DTCA on patient satisfaction with care, or the impact of DTCA and altered prescribing on actual health outcomes. There were also no studies that examined the cost effectiveness of DTCA by combining health outcomes and the economic costs of altered prescribing.

**DISCUSSION**

To our knowledge, this is the first application of a systematic review method in this area of practice and policy. Given the importance of DTCA and discussion that has taken place in the medical and lay press, we were surprised that the impact of this policy has not been subject to more extensive or rigorous evaluation. From the limited research available, our main conclusion is that DTCA does alter prescribing behaviour and volume. This conclusion is based on three interrupted time series studies and one comparative cross sectional study. Our review also highlights the fact that no studies have examined the impact of direct to consumer advertising on either health outcomes or examined the costs and health and social consequences of DTCA. These conclusions are based on a systematic evaluation of the research literature rather than an unsystematic (and potentially biased) overview.

Proponents of DTCA claim that advertisements are a legitimate source of quality patient information. Informing and empowering patients are major themes in the UK and in many healthcare systems, and a case for DTCA might be argued to help develop a more informed and assertive population. Arguments against DTCA principally centre on concerns about the pharmaceutical industry’s ability to produce unbiased information. Given the nature of market economics, the primary aim of DTCA campaigns is to increase market share and profit rather than enhance well being. Hence, advertisements may not look at all treatment options including non-drug treatments, or provide a consumer with comprehensive information on potential adverse effects. Concerns about the quality of information in advertisements are in many cases justified, with one in four products violating the basic regulations set down by the Food and Drug Administration.

Hoffman and Wilkes, reflecting on the experience in the US, assert that DTCA “unreasonably increases consumer expectations, forces doctors to spend time disabusing patients of misinformation, diminishes the doctor-patient relationship because a doctor refuses to prescribe an advertised drug, or results in poor practice if the doctor capitulates and prescribes an inappropriate agent.”

The research presented in this review tends to support this assertion. No empirical research has demonstrated better communication and improved health outcomes. Given the lack of evidence of a beneficial effect on healthcare quality, concerns that DTCA undermines efforts to improve efficiency and cost-conscious prescribing—including use of generic drugs where branded drugs confer marginal benefit—appear well founded.

The results of the study conducted in the Netherlands also raises questions about the effects of industry funded disease awareness campaigns. The limited evidence available seems to suggest that such campaigns can increase market share and product awareness. Similarly, it does seem to create markets which did not previously exist by generating demand for treatments for non-life threatening conditions about which the public has little awareness—such as fungal nail infections, social anxiety disorder, or female sexual dysfunction. From the perspective of the pharmaceutical industry, disease awareness campaigns may offer an alternative promotional approach in regions where DTCA is currently prohibited. However, from the perspective of healthcare systems and governments struggling to contain ever increasing drug budgets, campaigns to increase awareness of non-life threatening conditions could generate demand for treatments which will ultimately divert time and resources away from other more important conditions. This is a topic where further research is clearly justified.

Since DTCA is currently banned in most parts of the world, legislators and policy makers will periodically revisit the issue of whether DTCA should be allowed. Similarly, there is a powerful lobby on the part of the pharmaceutical industry to allow DTCA. The main finding of this review is the identification of a void in terms of the evidence of the wider impact of DTCA – over and above increased prescriptions and market share. Policy making must therefore proceed in the absence of a definitive answer as to the specific consequences of DTCA on individual patient care and healthcare systems. The onus is on those who might support DTCA to produce evidence of benefit and, in the absence of this evidence, we must assume that the likely disbenefits (clinical and economic) outweigh the as yet unproven benefits. This opinion was reflected by Mintzes and colleagues when they examined this issue for the benefit of the Canadian healthcare system. They concluded that “We could find no evidence of improved drug utilization, improved doctor/patient relations, or reductions in hospitalization rates, serious morbidity or mortality attributable to DTCA. The aim of the prohibition of prescription drug advertising in Canada is health protection. Any legislative change that would weaken the current restrictions on such advertising should be based on strong evidence that concerns about potential harm are unfounded, and—ideally—evidence of health benefits. On the contrary, we found a considerable body of evidence suggesting that such concerns are warranted, and no evidence that DTCA is likely to improve the health.”

These are also the conclusions that can be drawn from the first systematic empirical overview of this topic.

**Key messages**

- Direct to consumer advertising (DTCA) is currently allowed only in the US and New Zealand.
- Proponents suggest DTCA is a legitimate form of patient education with the potential for more informed patients and better health care.
- Opponents question the wisdom of DTCA, since it potentially distorts the patient-doctor relationship, rational health policies and prescribing practice, and generates demand without necessarily improving health outcomes.
- A systematic review of evidence of the clinical and economic consequences confirms that DTCA does influence patient demand and doctor prescribing behaviour. No evidence of health benefit was found since this had not been examined in any detail.
- Calls to allow DTCA should be resisted in the absence of any evidence of benefit from such an influence of prescribing behaviour.

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**Notes**

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